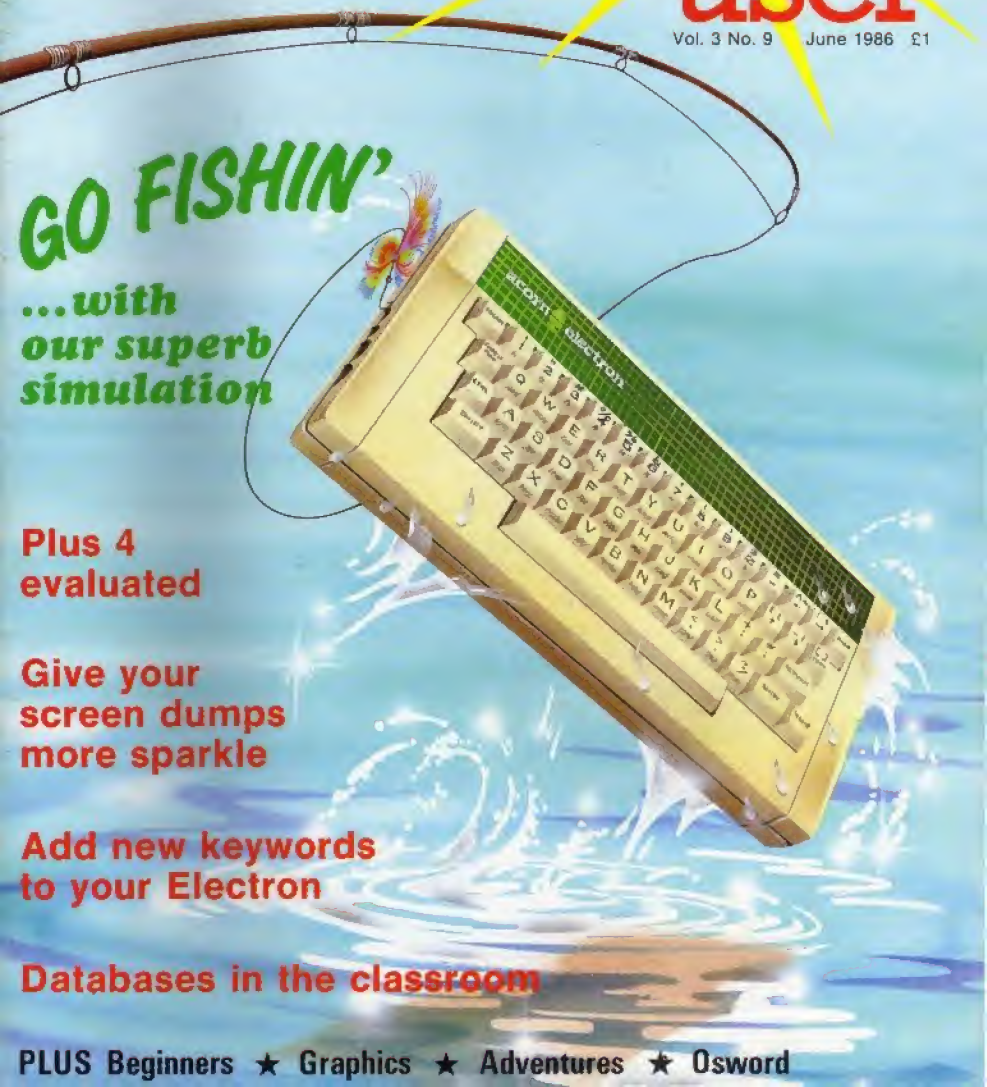
A Database Publication

electron user

Vol. 3 No. 9 June 1986 £1



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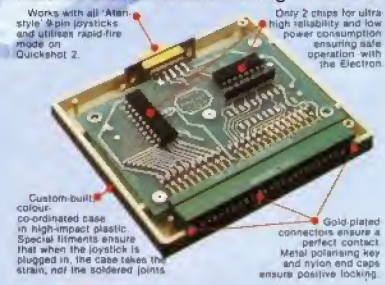

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FIRST BYTE

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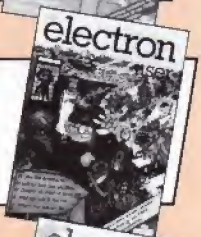
Electron User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

BAFFLED BY BASIC?

Get to grips with your micro with the help of the superb, easy to read series for beginners featured in *Electron User*. By the time you've read the first nine articles from Volume 1, you'll know so much more about how your Electron works.

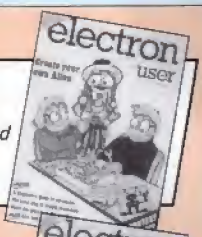
February 1984
Using the keyboard and getting started. An introduction to the PRINT command.

March 1984
Your first program, printing text on the screen, using Basic's LIST and RUN.



April 1984
Introducing string variables, the LET command and using punctuation marks.

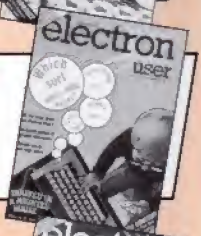
May 1984
An introduction to simple maths and the correct use of numeric variables.



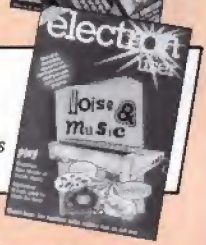
June 1984
More on string and numeric variables and their use with the INPUT command.

July 1984
A close look at FOR/NEXT loops and how to use them with PRINT.

August 1984
Delving further into FOR/NEXT loops we investigate the STEP command and its use.



September 1984
Nesting FOR/NEXT loops is as easy as pie when explained as simply as this.



October 1984
Still on loops we show how to avoid getting your variables in a twist.

Any 6 issues for £5
Any 9 issues for £7

TO ORDER, PLEASE USE THE FORM ON PAGE 61

electron user NEWS

Hunt for a games star

HOW would you like to earn £35,000 in just a few months? That's what Tim Tyler, author of the famous Repton games for the Electron, has made in royalties so far.

Now Repton publisher Superior Software has launched a campaign to try and discover another Tim Tyler from the ranks of hobbyist programmers.

Managing director Richard Hanson told *Electron User:* "This programmer recruitment drive is unique. Only a few companies have used full-colour advertising for this purpose before, and we are offering a free guidebook telling programmers how to get the best deal for their work.

"We have aimed at producing an unbiased, informative guide – although if a programmer phones me I'll give him many good reasons why he should let Superior Software publish his games".

The guidebook, Top Tips for Games Authors, contains a lot of sound advice. The section on submitting programs, for example, reads: "To maximise your earnings, ask for a royalty for every copy sold. This way you will benefit if the game sells really well".

Electron sales saved Acorn's bacon

ELECTRON sales played a critical role in rescuing Acorn from the brink of financial collapse last year.

The company's latest set of accounts show how close it was to total disaster 12 months ago, with losses running at more than £20 million and £18 million worth of unsold micros cluttering its warehouses.

But by the end of the year Acorn was less than £3 million in the red and stocks had been reduced to under £8 million.

Executives are now forecasting that the company will be in profit by the end of 1986.

The healthier financial picture was made possible by the popularity of the Electron, which became the best selling home computer in the UK during the crucial run up to Christmas, knocking the Spectrum out of the number one spot.

Acorn's deal with High Street giant Dixons cleared the shelves of up to 100,000 Electrons and gave the company a much-needed massive cash injection.

Takeover

This, together with new management strategy following the Olivetti takeover, helped Acorn through the most perilous period in its history.

Acorn's bosses can now see daylight at the end of the tunnel for the company, which was in deep financial distress until Electron sales took off.

"The latest figures are marginally better than we had dared hope for", a company spokesman commented.

And managing director Brian Long is even talking about the poss-

Turn to Page 7

IS A NEW MODEL ON ITS WAY?

RUMOURS are circulating in the computer industry that Acorn is considering producing a new version of the Electron.

It would have enhanced features, possibly including a built-in Plus 1 to provide printer interface, joystick interface and slots for cartridge software.

Shadow RAM for more memory, and even Mode 7 colour graphics, are believed to be among the ideas being considered by Acorn's research and development team.

And an RS423 port for comms, to complement the Plus 1 capability, is also thought to be a possibility.

"It sounds as though Acorn is thinking of turning out what amounts to a kind of BBC Model B with the Electron name on it", a technical expert told *Electron User.*

"But this is not so far fetched an idea when you consider that the Electron has shaken off its former image as a mere games machine over the past 12 months.

"It is already a computer for the serious user with its communications, disc drives, languages and ROM expansion boxes.

"Numerous firms have brought out add-ons in recent months that have boosted the Electron's performance to around the level of a BBC Micro, and there are several new products being launched at the Electron & BBC Micro User Show at the Royal Horticultural Hall in May".

Although Acorn executives would not comment on the rumours, they are known to have been impressed by the Electron's continuing success as a top selling micro and the ongoing support for the machine from third party software and hardware suppliers.

They figure that if the public wants Electrons, and more than 250,000 have been sold so far, then the time may be ripe to bring out an enhanced model to fill the slot in the market created as the BBC Micro is superseded by the B Plus and the Master series.

ELECTRON & BBC MICRO USER SHOW

The show that gives you the FIRST look at all the latest hardware and software now being produced for the BBC Micro and Electron

Friday to Sunday, May 16 to 18

Royal Horticultural Hall
Westminster, London SW1

Problems? Then this is the show where you'll find the answers! Leading experts in all aspects of the BBC Micro and Electron will be there to lend a helping hand – whether you're a beginner or an advanced user.

See the BBC Master 128 and Master Turbo Upgrade – first of the exciting new generation of BBC Micros

Lots of bargain bundles

. . . as suppliers clear the decks for all the new season's products

Show opens 10am each day. Closes 6pm Friday & Saturday; 4pm Sunday

Organised by Database Exhibitions

Some of the leading companies you can meet at the Show

Advanced Computer Products, Advanced Memory Systems, Amten Ltd, Banbury Systems, Beebugsoft, Blue Ribbon Software, Care Electronics, CJ Micros, Computer Bookshops, Computer Concepts, Database Publications, Datastar, Direct Disc Supplies, Disking Int, Fernleaf Educational Software, Gemini Marketing, Glentop Publishers, Grafsales, Griffin Computers, Hantarex (UK) Ltd, HCCS, HSV Computer Services, IDS Computer Supplies, Kansas City Systems, LCL Educational Software, Leisure Express, Logic Sales, Meadmore Distribution, Micro Aid, MicroLink, Micromart, Micro Media Computer Services, Micronet 800, Micro Power, Micro Resources, Micro Simplex, Minerva, Miniature Tool Company, Norwich Computer Services, Opus Supplies, Pace Microtechnology, Pineapple Software, Private Tutor, Rams Computers, Rickets Educational Media, Shards Software, Slogger Ltd, Software International, Software Plus, Solidisk Technology, System, Thingi, Twillstar, Tynesoft, Viglen, Vine Micros, Watford Electronics, Wigmore House, Zonefour.

New jobs drive gets Electron power...

Delegates at the Inter-Action conference

ELECTRONS could help transform Britain's youth clubs into job "springboards".

Ed Berman, founder of Inter-Action, an educational non-profit making charity, says: "Very little organised computer activity takes place in youth clubs, yet these young people are the very ones who could make the most of the opportunity to explore computing.

"If they can get away from computer games, youth clubs could transform themselves into occupational springboards by using micros like the Electron in an imaginative way".

His theme was projected and expanded at a national conference on computer work in the youth service held aboard the Royal Princess on the Thames.

Another speaker was Mike Fordham, senior youth worker at the Honor Oak Youth Club, Lewisham.

He told how micros at his club catered for members from the age of eight to 21 years.

"They, of course, start with games and then progress into serious studies. I think within the next five years no one will be able to get a job stacking shelves unless they can use a computer to check the stocks. There is a real need for computers in youth clubs", he said.

● The Department of Education and Science has just announced a £75,000 grant, over the next three years, to Inter-Action for their youth club community computer projects.

It is subject to them raising matching funds.

New products line up for big Show

NEW products continued to pour on to the scene as the countdown began for the Electron & BBC Micro User Show at the Royal Horticultural Hall in London, May 16 to 18.

Organiser Database Exhibitions says the rate at which stands and advance tickets have been snapped up indicates the event is set to break all previous show records. Just announced are two important new products for the Electron from Advanced Computer Products.

ADI is a powerful disc utility ROM for standard and non-standard discs, which will sell for £28.75.

Advanced ROM Manager, a utility for ROM and sideways RAM users, is being offered at a special introductory price of £9.99.

A major attraction at the show will be a series of teach-ins featuring a team of experts on Acorn products.

SPACE agent Starman is back with his rescue missions in Bug Eyes II for the Electron.

Audiogenic Software's sequel to Bug Eyes has the daring hero in the rusting hulk of a flagship trying to retrieve 25 keys and save the entombed Zelda. Cassette price is £7.95.

Gamesters get their prizes

RESULTS of two competitions based on games from Superior Software for the Electron have been announced.

Each successful entrant to the Repton 2 competition, which involved completing all 16 screens of the game, received a colourful T shirt.

Winner of the draw for which all correct entries qualified was Simon Irwin of Hockley, Essex, who received £200.

Competitions were also held in connection with the graphic adventure Citadel. Chee Mann of London was the first person to find two of the three hidden crowns and received a prize of £100.

Darin Walden of Gateshead and Michael Lane of Hampton, Middlesex, completed the Electron version of Citadel on the same day. They each received £100 and an engraved shield.

Superior Software says Repton 3 will be released later this year and will include a screen designer, character designer, more features and more screens.

Sales save Acorn

From Page 5

ibility of operating at a profit again this year.

"I shall be extremely surprised if we make a loss in 1986 and extremely pleased if there's a significant profit", he said.

Acorn's marketing manager, Bob Coates, was quick to pay tribute to the part the Electron had played in salvaging the company's fortunes.

"It has been a success story for the Electron since before Christmas", he told *Electron User*.

"The market for this machine considerably improved to the benefit of Acorn.

"And the vastly increased user base means that there is greater support from third party suppliers in terms of new software and add-ons".

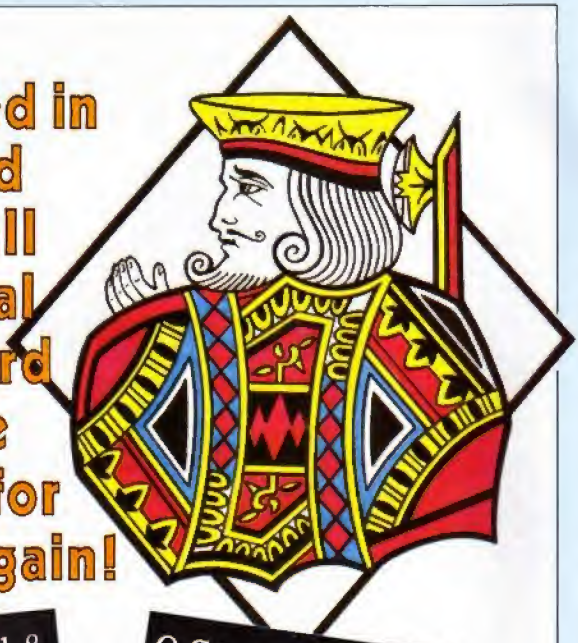
The success of the Electron during the last half of 1985 smoothed Acorn's path through what Brian Long calls "a transitional period in which the company defined a strategy for its future and took major steps to re-establish its operations on a sound basis.

"We attacked the problem of excess stocks and purchase commitments, reducing the former from £18 million at June 30 to £7.9 million at year end", he said.

"Significant progress has also been made in streamlining corporate activities and reducing overheads".

Long says Acorn's activities are now centred on three areas – high technology research and development, exploitation of R & D along strictly defined specialist sectors, and new deals with original equipment manufacturers.

Now combined in two fun-filled packages... all the traditional card and board games you've been asking for - again and again!



Electron cassette can also be used on the BBC Micro

Electron cassette £5.95 each

3½" disc £7.95 each

TO ORDER, PLEASE USE THE FORM ON PAGE 61

TACTICAL PURSUIT

By IAN WEBSTER

TACTICAL Pursuit is a game for two players, played using pawns on a chess board.

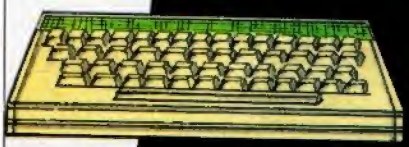
White goes first and the object is to get one of your pawns to the other side of the 8 x 8 board.

Enter the coordinates, vertical then horizontal, for the piece you wish to move, followed by those of the square you wish to move to.

To take one of your opponent's pieces you simply move forward or diagonally on to an occupied square. You may not take a pawn on your opponent's back row.

The number of men remaining for each player and the number of moves taken are displayed at the bottom of the screen.

I got the idea for Tactical Pursuit when our class was told to make up a board game, so some of the credit must go to my English teacher Mr Burnett.



PROCEDURES

TITLE	Displays title.
INSTRUCT	Displays instructions.
CLS	Draws and deletes lines for start of game.
CLS2	Clears screen by drawing over it in gcol0,0
GAME	Calls up movement and checks for winners.
PLAYER1/2	Gets coordinates for movement.
CHECK()	Checks if a man is at player's coordinates.
CHECK1	Checks if move is legal.
CHECK2	Checks if anyone has won.
RESULT	Displays winner.

VARIABLES

GOES	Number of moves.
BLACK/WHITE	Number of men for each colour.
whitewin%+blackwin%	Flags for winners.
D$	Pawn graphic.
A,B,A1,B1	Coordinates for movement.

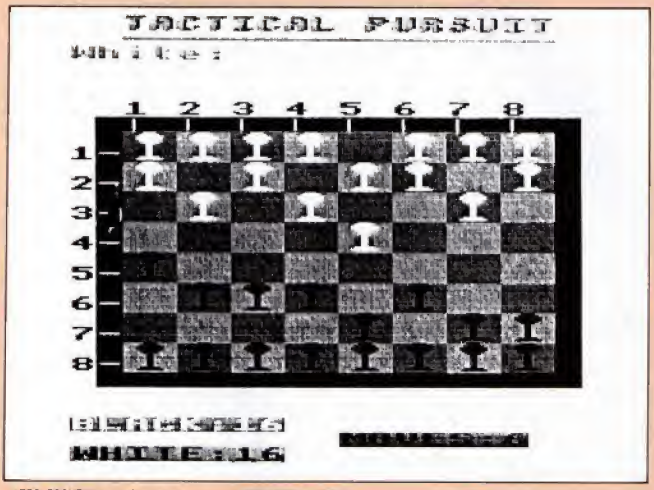
Full listing starts on Page 10

Tactical Pursuit listing

From Page 9

```
  10 REM Tactical Pursuit
  20 REM By Ian Webster
  30 REM (c) Electron User
  40 ONERRORMODE6:REPORT:P
RINT" at line ";ERL:END
  50 *FX16
  60 MODE1:COLOUR130:CLS:V
DU23;8202;0;0;0;:VDU23,254,
255,255,255,255,255,255,255
,255:PROCTITLE
  70 MODE4:VDU23;8202;0;0;
0;19,0,4;0;19,1,6;0;:PROCIN
STRUCT
  80 REM initalise
  90 G=1
 100 GOES=0
 110 DIM bX(8,8)
 120 FORA=1 TO 8:bX(A,2)=1
:NEXT
 130 FORA=1 TO 8:bX(A,1)=1
:NEXT
 140 FORA=1 TO 8:bX(A,7)=2
:NEXT
 150 FORA=1 TO 8:bX(A,8)=2
:NEXT
 160 BLACK=16:WHITE=16
 170 whitewinX=FALSE:black
winX=FALSE
 180 VDU23,254,0,16,16,16,
16,16,16,0
 190 VDU23,224,3,7,15,15,7
,3,1,1
 200 VDU23,225,192,224,240
,240,224,192,128,128
 210 VDU23,226,1,1,1,1,1,7
,15,0
 220 VDU23,227,128,128,128
,128,128,224,240,0
 230 VDU23,255,0,0,0,0,255,2
55,0,0,0
 240 REM playing piece
 250 D$=CHR$224+CHR$225+CH
R$8+CHR$8+CHR$10+CHR$226+CH
R$227
 260 MODE5
 270 PROC3D("TACTICAL PURS
UIT",128,1020)
 280 COLOUR2:PRINTTAB(2,1)
;STRING$(16,CHR$255)
 290 VDU23;8202;0;0;0;:PRO
Cdisplayboard:PROCCOLOURS
 300 COLOUR1:PRINTTAB(2,1)
;STRING$(16,CHR$255)
 310 REM start game
 320 PROCCLS:PROCGAME
 330 DEFPROCdisplayboard
 340 REM display board and
 seen
 350 COLOUR129:COLOUR0:PRI
NTTAB(0,28);"BLACK:";BLACK;
:COLOUR128:PRINT;" ";:COLOU
R3:COLOUR129:PRINTTAB(0,30)
;"WHITE:";WHITE;:COLOUR128:
PRINT;" ";:COLOUR130:PRINTT
AB(10,29)"MOVES:";GOES;:COL
OUR128
 360 IF G=1 THENCOLOUR131:
VDU28,1,25,18,8:CLS:COLOUR1
28:VDU26:G=0
 370 COLOUR128
 380 COLOUR3:PRINTTAB(2,7)
;"1 2 3 4 5 6 7 8 "
 390 COLOUR131:COLOUR0
 400 PRINTTAB(2,8);STRING$
(8,CHR$254+CHR$32)
 410 FORfX=1 TO 8
 420 COLOUR3:COLOUR128:PRI
NTTAB(0,fX*2+8);fX;:COLOUR1
31:COLOUR0:PRINT;"-"
 430 FORgX=1 TO 8
 440 COLOUR129:COLOUR0
 450 IF (gX+fX) MOD 2=0 TH
ENCOLOUR130
 460 IF bX(fX,gX)=0 PRINTT
AB(fX*2,gX*2+7);"  "TAB(fX*
2,gX*2+8);"  "
 470 IF bX(fX,gX)=1 PRINTT
AB(fX*2,gX*2+7);D$
 480 IF bX(fX,gX)=2 COLOUR
3:PRINTTAB(fX*2,gX*2+7);D$
 490 NEXT:PRINT''':NEXT
 500 COLOUR128:COLOUR3
 510 ENDPROC
 520 DEFPROCCLS
 530 REM draw and delete l
ines for
 540 REM display
 550 FORA=0 TO 1280 STEP40
 560 GCOL3,3
 570 PROCDRAW
 580 GCOL3,3
 590 NEXT
 600 ENDPROC
 610 DEFPROCDRAW
 620 MOVEA,0
 630 DRAWA,1024
 640 MOVE1280-A,0
 650 DRAW1280-A,1024
 660 ENDPROC
 670 DEFPROCCLS2
 680 FORA=0 TO 512 STEP4
 690 SOUND1, -15,600-A,1
 700 GCOL0,0
 710 PROCDRAW2
 720 NEXT
 730 ENDPROC
 740 DEFPROCDRAW2
 750 REM 'cls' screen by d
rawing over it
 760 MOVE0,A
 770 DRAW1280,A
 780 MOVE0,1024-A
 790 DRAW1280,1024-A
 800 ENDPROC
 810 DEFPROCGAME
 820 REM main loop for gam
e
 830 REPEAT
 840 PROCPLAYER1
 850 PROCCHECK2
 860 IF whitewinX=TRUE THE
N900
 870 GOES=GOES+1
 880 PROCPLAYER2
 890 PROCCHECK2
 900 UNTILwhitewinX=TRUE O
R blackwinX=TRUE
 910 PROCCLS2:PROCRESULT
 920 END
 930 DEFPROCPLAYER1
 940 REM player one move n
ow..
 950 VDU4
 960 COLOUR1:PRINTTAB(0,2)
;SPC(40)TAB(0,2);"White:";:
COLOUR3
 970 A=GET-48
 980  IF A>0 AND A<9 THEN
PRINT;A; ELSE 970
 990 B=GET-48
1000 IF B>0 AND B<9 THEN P
RINT;",";B;"-"; ELSE 990
1010 REM is there a piece
 at your
1020 REM co-ordenates?
1030 IF FNBOARD(A,B)<>2 TH
EN VDU7:GOTO960
1040 A1=GET-48
1050 IF A1>0 AND A1<9 THEN
PRINT;A1; ELSE 1040
1060 B1=GET-48
1070 IF B1>0 AND B1<9 THEN
PRINT;",";B1; ELSE 1060
1080 REM is move legal?
1090 PROCCHECK(A1,B1,2):IF
no=1 THEN VDU7:GOTO960
1100 PROCCHECK1:IF B1=B-1
AND A1=1 bX(A,B)=0:bX(A1,B1
)=2:SOUND1,-15,150,5:PROCdi
splayboard:ENDPROC
1110 VDU7:GOTO960
1120 DEFFNBOARD(X,Y)
1130 =bX(X,Y)
1140 DEFPROCCHECK(X,Y,C)
1150 REM has anything been
taken?
1160  IF bX(X,Y)=C THEN no
=1:ENDPROC
1170  IF bX(X,Y)=0 THEN no
=0:ENDPROC
1180  IF C=2:IF Y=1 AND FN
BOARD(X,1)=1:no=1:ENDPROC E
LSE IF C=2:IF Y=1 AND FNBOA
RD(X,1)=0:ENDPROC
1190 IF C=1:IF Y=8 AND FNB
OARD(X,8)<>0 ENDPROC ELSE I
F C=1:IF Y=8 AND FNBOARD(X,
8)=0:ENDPROC
1200 IF C=2 BLACK=BLACK-1
1210 IF C=1 WHITE=WHITE-1
1220 no=0
1230 SOUND1,-15,170,5
1240 ENDPROC
1250 DEFPROCCHECK1
1260 REM is move leagal?
1270 IF A=A1+1 THEN A%=1:E
NDPROC
1280 IF A=A1-1 THEN A%=1:E
NDPROC
1290 IF A=A1 THEN A%=1:END
PROC
1300 A%=0
1310 ENDPROC
1320 DEFPROCCHECK2
1330 REM has anyone won?
1340 FORA=1 TO 8
1350 IF bX(A,1)=2 THEN whi
tewinX=TRUE
1360 IF bX(A,8)=1 THEN bla
ckwinX=TRUE
1370 IF BLACK=0 whitewinX=
TRUE
1380 IF WHITE=0 blackwinX=
TRUE
1390 NEXT
1400 ENDPROC
1410 DEFPROCPLAYER2
1420 REM come on player 2
1430 COLOUR3:PRINTTAB(0,2)
;SPC(40)TAB(0,2);"Black:";:
COLOUR1
1440 A=GET-48
1450 IF A>0 AND A<9 THEN P
RINT;A; ELSE1440
1460 B=GET-48
1470 IF B>0 AND B<9 THEN P
RINT;",";B;"-"; ELSE 1460
1480 IF FNBOARD(A,B)<>1 TH
EN VDU7:GOTO1430
1490 A1=GET-48
```

```
1500 IF A1)0 AND A1<9 THEN
 PRINT;A1; ELSE 1490
1510 B1=GET-48
1520 IF B1)0 AND B1<9 THEN
 PRINT;",";B1; ELSE 1510
1530 PROCCHECK(A1,B1,1):IF
no=1 THEN VDU7:GOTO1430
1540 PROCCHECK1:IF B1=B+1
AND A1=1 bI(A,B)=0:bI(A1,B1
)=1:SOUND1,-15,200,5:PROCdi
splayboard:ENDPROC
1550 VDU7:GOTO1430
1560 DEFPROCRESULT
1570 VDU19,0,4;0;
1580 PRINTTAB(2,0);STRING$
(8,D$+CHR$11)
1590 FORA=2 TO 26 STEP2:PR
INTTAB(0,A);D$;TAB(18,A);D$
:NEXT:PRINTTAB(2,28);STRING
$(8,D$+CHR$11);
1600 REM end of game who's
won?
1610 PRINTTAB(7,18)"WINS":
VDU19,1,0;0;
1620 IF whitewinI=TRUE PRO
CSD("WHITE",414,800) ELSE P
ROC3D("BLACK",414,800)
1630 COLOUR3
1640 PRINTTAB(3,15);GOES;"
Moves made."
1650 COLOUR1
1660 PRINTTAB(4,26)"PRESS
SPACE"
1670 *FX15,0
1680 REPEATUNTILGET=32
1690 CLEAR:GOTO70
1700 DEFPROCINSTRUCT
1710 REM instructions
1720 PRINT SPC(12)"TACTICA
L PURSUIT"SPC(24)"**********
********"
1730 PRINT"    By Ian Webs
ter for Electron User
    ************************
********"
1740 PRINT"A game for 2 pl
ayers. White goes first."
1750 PRINT
1760 PRINT" The idea of th
e game is to get one of  yo
ur men to the other side of
 the board.You move like so
:"
1770 PRINT "Always 1 squar
e forward. You may move 1 s
quare diagonaly but moving
1 forward aswell.""""Taking
"'********
```




```
1780 PRINT"You take by mov
ing on to an occupied  sq
uare, (NOT your own colour)
."
1790 PRINT
1800 PRINT"Note you may no
t take one of the back  ro
w."
1810 PRINT
1820 PRINT SPC(20)"1st""SP
C(18)"_____"SPC(18)"
("SPC(18)"|"SPC(15)"2nd|"
1830 PRINT SPC(18)"|"SPC(
18)"|"'"Enter coordinates
in this order"
1840 PRINT
1850 PRINT"  Press SPACE
-BAR to start";
1860 REPEATUNTILGET=32:END
PROC
1870 DEFPROC3D(A%,X,Y):VDU
5
1880 GCOL0,3
1890 MOVEX,Y:PRINTA%
1900 GCOL0,1
1910 MOVEX-4,Y-4:PRINTA%
1920 VDU4
1930 ENDPROC
1940 DEFPROCTITLE
1950 REM draw title screen
using DATA
1960 VDU19,1,2;0;:*FX4,2
1970 GCOL0,0
1980 VDU5:MOVE96,892
1990 FORC=1 TO 2
2000 IF C=2 MOVE91,887:GCO
L0,1:RESTORE
2010 D=887
2020 FORA=1 TO 11
2030 READA$
2040 FORB=1 TO LEN(A$)
2050 IF MID$(A$,B,1)="*" T
HENVDU254 ELSE VDU32
2060 NEXT:D=D-32:PRINT:IF
C=2 THEN MOVE91,D ELSEPRINT
;TAB(3);
2070 NEXT
2080 NEXT:VDU4:COLOUR0:PRI
NTTAB(0,20);"    By Ian Web
ster for Electron User
    ************************
********":COLOUR3
2090 VDU19,3,8;0;:PRINTTAB
(2,30)"PRESS THE SPACE BAR
FOR INSTRUCTIONS"
2100 REPEATUNTILGET=32
2110 ENDPROC
2120 DEFPROCCOLOURS:PRINTT
AB(0,3)"SPACE TO CHANGE":PR
INTTAB(0,4)"COLOUR,RETURN T
O":PRINTTAB(0,5)"SELECT COL
OUR":COLOUR1:PRINTTAB(2,2)"
CHANGE COLOURS"
2130 A=1
2140 FORAA=1 TO 2
2150 REPEAT:VDU19,AA,A;0;
2160 A$=GET$
2170 IF A$=" " A=A+1:IF A=
7 A=1
2180 UNTIL A$=CHR$13
2190 A=3:NEXT
2200 PRINTTAB(0,3);STRING$
(60," ")
2210 ENDPROC
2220 DATA"***/***/***/***/
***/***/***/*"
2230 DATA"/*//*/*/*/*////*//
/*//*///*/*/*"
2240 DATA"/*//***/*////*//
/*//*///***/*"
2250 DATA"/*//*/*/*////*//
/*//*///*/*/*"
2260 DATA"/*//*/*/***//*//
***/***/*/*/***"
2270 DATA""
2280 DATA"//***/*/*/***/**
*/*//*/***/***"
2290 DATA"//*/*/*/*/*/*/*/
//*//*//*///*"
2300 DATA"//***/*/*/**//**
*/*//*//*///*"
2310 DATA"//*////*/*/*/*///
*/*//*//*///*"
2320 DATA"//*////***/*/*/**
*/****/***//*"
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

Program: Shuffle
Price: £2.99
Supplier: Budgie, 1 Orange Street, Sheffield S1 4DW.
Tel: 0742 739061

Problem patterns

SLIDING block puzzles are still a popular pastime for children and adults alike. This offering gives a choice of 15 different pictures for you to sort out.

The basic idea is that a picture is drawn on the screen, divided up into squares, and these squares are then shuffled. Your task is to get them back into the correct order and so re-make the picture.

There are three levels of difficulty. At the first level the picture needs only a few moves to get it back in order, whereas the third level will require many more.

The sound, which is simple but meaningful, can be turned off if required. You may mark the edge of each square with lines if you wish.

The pictures range from sequences of letters or numbers, through pictures of houses or flags to a series of patterns. All are pleasantly coloured, and a lot easier to complete with a colour television.

One of the spiral patterns is very difficult. It makes use of flashing colours and looks like nothing on earth until it is completed.

Technically the program is very good. My main gripes are that the keyboard repeat is left on and the choice of keys is unusual.

There is, however, a First Byte joystick option within the program and it works with a Plus 1 joystick too if you use the Joyplus program in the *Electron User* for April 1985.

This is a worthwhile program, with many interesting features. At the easy level it

could appeal to 5-year-olds, but the flashing spiral takes it right through to Einstein standard.

Rog Frost

Sound	5
Graphics	9
Playability	8
Value for Money	8
Overall	8

Program: Commando
Price: £9.95
Supplier: Elite, Anchor House, Anchor Road, Aldridge, Walsall. Tel: 0922 55852

Be your own Rambo

THIS is a game for the red blooded macho man who catches bullets in his teeth and eats three shredded wheat for breakfast.

Armed only with an M60 machine gun and six hand grenades you must make your way far behind enemy lines, annihilate the enemy troops and destroy their fortress.

Commando is a clone of the arcade hit of the same name, and it's not a bad effort. Using joystick or keyboard you can move the soldier in any of eight directions and your bullets are always fired in the direction in which you last travelled.

Hand grenades differ from bullets in that they are always thrown up the screen irrespective of which direction you are travelling.

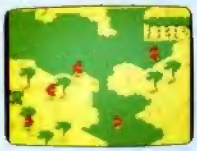
The action begins in a desert which is sparsely covered with trees and sand dunes. As soon as you appear you must start running forward while spraying bullets at anything which moves.

There's no chance of hitting any of your own troops as there are none – this is a suicide mission for which you drew the short straw.

Having survived the desert you encounter your first obstacle, for your foes are guarding a road bridge under which you must travel. Not only must you beware of soldiers coming under the bridge towards you but you must also avoid the hand grenades thrown by the motorcyclist who rides to and fro across it.

Following another stretch of desert you arrive at a high wall with a large gateway. As you approach the wall the gate opens and tens of troops rush out. These must all be killed before you are allowed to pass through the gate.

The next expanse of desert is riddled with trenches from which little men pop up and shoot at you. The game seems endless as you complete



screen after screen of hectic action.

Commando provides the same kind of excitement I felt when I first played Elite many moons ago, and I shall go back to it time and time again.

Jon Revis

Sound	6
Graphics	8
Playability	8
Value for Money	9
Overall	9

Program: Star Maze 2
Price: £1.99
Supplier: Mastertronic, 8-10 Paul Street, London EC2A 4JH. Tel: 01-377 6880

Not a maze to rave over

THE idea in Star Maze 2 is very simple – you are lost in a maze and your task is to escape. Regular watchers of BBC TV's Adventure Game will know the idea, but in this version there are no puzzles or passwords. The only problem is finding the exit.

You travel around the maze by moving forwards. When you want to change direction you may turn through 90 degrees left or right.

You don't see yourself – just a view of passages and junctions. These are neatly drawn and give a real impression of three dimensions.

The bottom of the screen is devoted to a status display which shows how long you've been stuck in the maze, how much energy remains, your position and how far you are from the exit.

Maze sizes – your choice – can vary between a small 5 × 5 up to a large 12 × 12 matrix. Large mazes are quite difficult to solve, but if you get really stuck, the computer can draw a map of the whole maze.

This program suffers from a number of drawbacks. The first is that it is very slow. It takes some 10 seconds for the computer to work out what you are looking at and then draw it.

Secondly, the mazes lack interest. Certainly they are random and different each time, but they tend to consist of long straight passages with very few junctions.

Finally, the game's ending is very weak. A congratulatory message just says "You've done it" while a dull five note tune repeats itself.

If you haven't got a maze game you could consider this.

Rog Frost

Sound	3
Graphics	7
Playability	6
Value for Money	7
Overall	6

Program: Micro Maestro
Price: £14.99 cassette
Supplier: Mupados, Llambed Industrial Estate, Tregaron Road, Lampeter, Dyfed. Tel: 0570 422877

Music made easier

PRACTISING on musical instruments can be a bit of a bore. You sit alone in front of your music stand and listen to your own squeaks, scrapes, and bad notes.

The aim of Micro Maestro is to put some of the fun back into the business.

Three different packages are available and you can choose between the version for keyboard instruments, concert pitch instruments such as recorder, trombone or stringed instruments or the version for B flat instruments. These include trumpet, clarinet and French horn.

Whichever version you opt for, you will get two cassettes plus a small booklet which tells you how to use the program. One cassette contains the software and the other has soundtracks of the music used.

The tunes are Ghostbusters, Happy Xmas (War is Over), Chariots of Fire, Superman, Dress You Up and Hello.

Loading the software will put the first tune into memory. You can then select from a number of options.

Firstly you may display the music on the screen one page full at a time. Next, the computer can play the music for you so that you can play along with it.

The musical notation is printed on the screen as you do this in a big, bold and clear form. It has its own way of scrolling which you soon get used to.

You can adjust the tempo so that it suits your stage of learning. You can also add a visual beat counter and a bouncing ball which marks the note currently to be played.

With growing confidence you can turn the computer sound off and play the music yourself with or without the beat counter and bouncing ball.

As a final touch you can play along with the audio cassette which has two versions of each tune, one being just the backing.

Pressing Break returns you to the main menu from which you can select a different piece of music in either treble, alto or bass clef.

This is a worthwhile package. However, it is limited to the tunes supplied with it and

the poor quality of the audio recordings rather spoiled the effect.

I would suggest these packages, which run on the BBC B and Electron, are more suited to the school music department, where many pupils could use them, rather than to the individual.

Rog Frost

Sound	7
Graphics	7
Educational value	7
Value for Money	6
Overall	6

Program: Bug Eyes 2
Price: £7.95
Supplier: Audiogenic, P.O. Box 88, Reading, Berks. Tel: 0734 303663

Stunner covered up

AFTER completing her mission to destroy the Xxabanean flagship agent Zelda was captured and imprisoned in the depths of a desolate asteroid.

You are agent Starman and must negotiate the asteroid's defence systems and find the 25 keys which are required to free her.

Neither the title nor the rather mediocre cassette cover do anything to entice you to buy this game, which is a pity as the game is a stunner.

Bug Eyes 2 could be summed up by the term "big is beautiful". Each of the screens in this ladders and levels game looks like it has been painted with a four inch brush.

The graphics for both the background and the sprites are big, chunky and colourful.

The simplicity of each screen does not necessarily make the game easy. It has been designed in such a way that you feel each screen is merely a tiny portion of a larger unseen screen.

Some of these sub-screens are linked directly – for instance, falling off the edge of a cliff will take you straight into the screen below.

Other screens are accessed via the lift shafts which riddle the asteroid.

On leaving the lift you are hoisted on to a Sinclair C5 and driven to the next screen.

The reliability of this mode of transport is suspect as you occasionally have difficulty starting the vehicle.

You enter the asteroid with five lives and a life is lost each time your oxygen supply is exhausted.

You can fall from any height without suffering damage but contact with an alien will deplete your oxygen supply.

The types of aliens range from huge spotted caterpillars

to enormous dinosaurs which fly with the aid of jet packs.

Playing Bug Eyes 2 is relaxing and enjoyable, and for my money it is one of the best games of its type to date.

Carol Barrow

Sound	7
Graphics	9
Playability	9
Value for Money	9
Overall	9

Program: Nightworld
Price: £7.95
Supplier: Alligata, 1 Orange Street, Sheffield S1 4DW. Tel: 0742 739061

Arcade adventures

NIGHTWORLD is an arcade style adventure game where you guide explorer Lee Lance around the different screens by jumping on to platforms and avoiding the nasties flying around at random.

Exits are at first quite obvious but as the game progresses you have to find the hidden passages which take you on to further screens.

The solid triangles help you increase your score, but beware, greed is often fatal.

The format is not new but there are some unusual additions. After a set amount of time you are changed into a gargoyle.

This gives you super powers, immunity to the nasties, and the ability to jump twice the normal height.

Instructions are brief but concise. I think a few hints or tips on where to look and what to look for would have been an advantage.

As it is I have not as yet been able to find out how to replenish my energy.

I was not addicted to this game, but if you like arcade adventures you will find it interesting and different.

David Richards

Sound	5
Graphics	7
Playability	7
Value for Money	6
Overall	6

Program: Mouse Trap
Price: £7.95
Supplier: Tynesoft, Addison Industrial Estate, Blaydon, Tyne and Wear NE21 4TE. Tel: 091-414 4611

Challenging Mouse Trap

IT is often said that there are only three or four types of computer game – mazes, ladders and levels, invaders and adventures, and that the majority of software fits into one of these categories.

Tynesoft's Mouse Trap is nothing new and slots neatly into the second category.

Although the format is familiar and holds no surprises, it is, nevertheless, very well written, enjoyable to play and quite addictive.

You take the part of Marvin the mouse, an athletic little rodent capable of leaping round the screen from platform to platform in his quest for cheese.

There are 22 different screens to master. On each there are several different objects to collect, some looking remarkably like Christmas puddings.

Somewhere on the screen there is a closed door, usually in the most inaccessible corner. Collect all the puddings and the door will open.

If you can make it in time you can walk through to the next screen.

The difficulty lies in the placing of the levels and the various nasty objects which fly around the screen.

There are teapots, cups and saucers, bottles of poison, witches on broomsticks, fireballs, bombs, fried eggs and many more.

To make matters worse there's also a time limit, so if you hang about too long wondering which way to go you'll run out of time and lose a life.

You have eight lives, but they disappear all too quickly.

Mouse Trap is an excellent multi-screen levels type of game. It is difficult, so I wouldn't recommend it to beginners.

But if you're looking for something more challenging than the usual run of the mill game look no further, Mouse Trap will keep you occupied for weeks.

Roland Waddilove

Sound	5
Graphics	8
Playability	8
Value for Money	8
Overall	8

Program: Winter Olympics
Price: £7.95
Supplier: Tynesoft, Unit 3, Addison Industrial Estate, Blaydon NE21 4TE. Tel: 091 414 4611

Olympics in the snow

WINTER Olympics is another of the several-games-in-one variety. Six winter sports are covered and the aim is to beat your best score in a snow-bound hexathlon.

The first event to flash up on the screen is speed skating. In this you take your competitor along a 200 metre course as quickly as possible, while the computer operates a pace-making opponent above you.

You move your player by rapidly hammering the Z and X keys, while a clock ticks away at the base of the screen.

The second event is the ski jump which works like the first event in that the faster you hammer the keys the further you jump.

Event three is the ski slalom. You have to guide your skier down a slope, zig-zagging through the gates as quickly as possible.

Then comes downhill skiing. No gates this time, just a full pelt down the slope, trying to avoid the fir trees that are scattered about. This is extremely tough and I still haven't completed the course.

Event five is the bobsled, and the formidable Cresta Run. The course is mapped out on the right of the screen and in a box on the left is your view from the sled.

Gravity provides the acceleration here, and the Z and X keys are used as brakes.

Lastly comes the Curling, which is probably the most disappointing event. The aim is to get your four stones as close as possible to the centre pin, while your opponent does the same.

Unfortunately there is no allowance for stones colliding. Thus it is impossible to knock a stone out of your way – you just stop short of it.

Overall this is a nice little package and fun to play. The graphics are quite good, sound is used well and the Electron's clock has never been so useful.

James Bibby

Sound	6
Graphics	8
Playability	7
Value for Money	7
Overall	7

Program: Way of the Exploding Fist
Price: £9.95
Supplier: Melbourne House, 60 High Street, Hampton Wick, Kingston-upon-Thames, Surrey KT1 4DB. Tel: 01-943 3911

Graphics with a punch

KARATE may be old news to the box office, but with all the new games coming on to the computer market one has to be the winner – The Way of the Exploding Fist.

The scenario, two men locked in combat presided over by a Buddha and a monk, is simple, but it demands great skill and concentration to reach the goal of 10th Dan by fighting and defeating your opponents.

One or two player modes are available, each with a very different challenge to offer. In a one player game it is best to defeat the computer with the utmost speed and precision within the time of 30 seconds. For each two fights won you progress one Dan.

The point system showing how you are faring is made up of the Yin Yang symbol, awarded in full or half sections. Two full Yin Yang symbols are needed to defeat each opponent.

In two player mode four 30 second bouts must be fought out, the winner being the player with most points.

The keys are well placed at different ends of the keyboard though there are 18 moves and 10 keys to cope with.

The variety of moves seem endless, with kicks, jabs, blocks, punches and somersaults. This game is definitely the best of the karate simulations.

The backdrop on the proceedings gives one a feeling that the programmer put as much effort into it as with the detail on the two characters.

Giles Lane

Sound	6
Graphics	9
Playability	9
Value for Money	9
Overall	8

Part 3

OSWORD

JOHN WOOLLARD shows how Osword graphics calls can be used in machine code programs – and help augment our Basic programming powers

WE'RE going to take a look at the Osword calls associated with screen graphics this month. Some of the programs will use machine code techniques but others will enable us to enhance the powers of Basic.

Program I illustrates Osword call 9 which is equivalent to the Basic function POINT used to find the colour of a pixel at a specific coordinate.

```
  10 REM PROGRAM I
  20 MODE 2
  30 colour% = RND(16)-1
  40 GCOL 0, colour%
  50 xpos% = RND(900) : ypos% = RND(900)
  60 PLOT 69, xpos%, ypos%
  70 osword% = &FFF1
  80 block% = &900
  90 !block% = xpos% + ypos%*10000
 100 X% = block% MOD 256
 110 Y% = block% DIV 256
 120 A% = 9
 130 CALL osword%
 140 PRINT "Random colour: "; colour%
 150 PRINT "Osword value: "; ?(block%+4)
 160 PRINT "POINT value: "; POINT(xpos%,ypos%)
 170 END
```

Program I

The program selects a random colour and position for a series of dots and displays them on the screen with the results of using POINT and Osword 9 subsequently displayed in a table.

Here's how it works. The selection of the colour (line 30) and the random selection of a point upon the screen (line 50) are carried out before the Osword call is set up and made.

All Osword calls require a small section of memory called the parameter block to store data, and in this particular program I've used location &900 onward. Osword 9 requires that the coordinates of the point to be tested are placed in that block.

Line 90 uses the ! (pling) indirection operator to do that. The X and Y registers are then set to point to &900 and A is set to 9 before the call is made in line 130.

Table I shows the structure of the Osword 9 parameter block.

Line 150 peeks into the fifth location of the block (XY+4) and prints the value returned. Compare this with the value returned by the Basic function POINT in line 160 and you'll see that they are the same.

Although Osword 9 has no real value to Basic programmers – POINT does the job more easily – this program illustrates the main structures of making Osword calls, which are:

- Select a location for the parameter block to reside.
- If necessary place values in the parameter block.
- Place the address of the parameter block in the X and Y registers (X takes the lo byte, Y the hi).
- Place the Osword call number in the A register.
- Make the call to &FFF1.
- If necessary read the results from the parameter block.

block%	YX	x coordinate lo byte
	YX+1	x coordinate hi byte
	YX+2	y coordinate lo byte
	YX+3	y coordinate hi byte
	YX+4	returns the logical colour of the coordinate

Table I: Osword 9 parameter block

	block%	
&900	YX	previous x coordinate lo byte
&901	YX+1	previous x coordinate hi byte
&902	YX+2	previous y coordinate lo byte
&903	YX+3	previous y coordinate hi byte
&904	YX+4	current x coordinate lo byte
&905	YX+5	current x coordinate hi byte
&906	YX+6	current y coordinate lo byte
&907	YX+7	current y coordinate hi byte

Table II: Osword 13 parameter block

In Program II Osword call 13 reads the coordinates of the last two points the graphics cursor has visited and is used by the operating system when PLOT 85 is used to fill a triangle.

Table II illustrates the parameter block associated with the call and Program II shows how the call can be made from Basic.

Lines 20 to 80 plot two random points on a Mode 1 screen. The Osword call is then made using &900 as the start of the parameter block.

Lines 150 to 190 analyse the block and display the information against the values of the coordinates plotted. You'll see that this reveals an interesting characteristic of the graphics screen.

The disparity occurs because the screen size is 1280 by 1024 yet its true resolution is far less. For instance in all graphics modes there are only 256 pixels vertically but 1024 graphics

→

```
  10 REM PROGRAM II
  20 MODE 1
  30 DIM points%(3)
  40 FOR k% = 0 TO 3
  50 points%(k%)=RND(1000)
  60 NEXT
  70 PLOT 69,points%(0),points%(1)
  80 PLOT69,points%(2),points%(3)
  90 osword% = &FFF1
 100 block% = &900
 110 X% = block% MOD 256
 120 Y% = block% DIV 256
 130 A% = 13
 140 CALL osword%
 150 PRINT' "Coordinates of points"
 160 PRINT  "Sent        Read"'
 170 FOR k% = 0 TO 3
 180 PRINT points%(k%), ?(block%+k%*2) + ?(block%+k%*2+1)*256
 190 NEXT
 200 END
```

Program II

From Page 15

coordinates. This means that each pixel is addressed by 1024/256 or four Y coordinates.

Program III utilises the techniques developed in Programs I and II to read the logical colour of a particular pixel on the screen. The whole process is carried out in machine code.

Lines 60 to 90 set up and call Osword 13 to reveal the last two coordinates visited by the graphics cursor. The parameter block is placed in the area immediately after the program.

The second Osword call made on line 130 returns the logical colour of the pixel. The parameter block is located over part of the first block. Table III shows how the data returned by the first call is used to determine the action of the second call.

Finally lines 140 and 150 tease out the important value and place it in location &70.

The section of Program III from line 200 onward plots 10 points of randomly selected colours. After each point is plotted a call to the machine code program is made and the value of the colour is printed in a table. This routine can be used in machine code games for collision detection.

You could use the Osword technique developed in Program II to add an extra facility to the graphic powers of your computer. You'll be aware of the triangle plotting options PLOT 80 to PLOT 87. The procedure in Program IV uses Osword call 13 to draw rectangles in a similar manner.

Calling PROCrectangle will fill a rectangular shape with colour. The size of the rectangle is determined by the last two points visited by the graphics cursor, and the colour is the current graphics colour.

Program IV selects two random points on a Mode 0 screen and then constructs the rectangle. This is how the procedure works.

Line 80 sets the plot number to 85 – triangle absolute plotting in the current graphics foreground colour. Changing the plot number to 21 with:

```
100 plot% = 21
```

produces an outline of the rectangle but doesn't fill it.

The parameter block for the Osword call is located from &900 onward. The call is set up and made between lines 90 and 140.

Lines 150 to 180 tease out the data from the parameter block and place it in the variables *px%, py%, cx%* and *cy%* – that's the last X, last Y, current X and current Y coordinates respectively. Lines 190 to 220 plot the rectangle.

We'll now turn to another use of an Osword call that gives us more programming power. Osword 11 is associated with the colour palette.

There are 16 logical colours on the Electron and in Mode 2 all are available on the screen simultaneously. However the other modes have a restriction on the number of colours that may be used at any one time.

So that you can have a choice of colours on the screen each logical colour can be assigned a specific physical colour. Colour 1 can be red, yellow, blue or whatever you want. That's called writing to the palette and is carried out using the VDU 19 statement.

Osword gives us the power to read the physical colour attributed to a particular logical colour. This isn't possible using VDU or any other Basic instruction.

Program V reveals the physical colours assigned to

```
10 REM PROGRAM III
20 DIM programX &30
30 FOR optX = 0 TO 3 STE
P 3
40 P% = programX
50 [ OPT optX
60 LDX# blockX MOD 256
70 LDY# blockX DIV 256
80 LDA# 13
90 JSR &FFF1
100 LDX# (blockX+4)MOD256
110 LDY# (blockX+4)DIV256
120 LDA# 9
130 JSR &FFF1
140 LDA blockX+8
150 STA &70
160 RTS
170 .blockX
180 ]
190 NEXT
200 MODE 2
210 FOR pointX = 1 TO 10
220 GCOL 0, RND(16)-1
230 PLOT 69,RND(1000),RND
(1000)
240 CALL programX
250 PRINT pointX,?&70
260 NEXT
270 END
```

Program III

block%	YX	previous	
block%+1	YX+1	x,y	
block%+2	YX+2	coordinate	
block%+3	YX+3		
block%+4	YX+4	current	YX
block%+5	YX+5	x,y,	YX+1
block%+6	YX+6	coordinate	YX+2
block%+7	YX+7		YX+3
block%+8			YX+4

YX for the second Osword call with A=9 is set to the YX+4 value of the first call.

Table III: Oswords 9 and 13 parameter blocks

```
10 REM PROGRAM IV
20 MODE 0
30 MOVE RND(900)+100, RN
D(800)+200
40 MOVE RND(900)+100, RN
D(800)+200
50 PROCrectangle
60 END
70 DEFPROCrectangle
80 plot% = 85
90 oswordX = &FFF1
100 blockX = &900
110 X% = blockX MOD 256
120 Y% = blockX DIV 256
130 A% = 13
140 CALL oswordX
150 pxX = ?blockX + ?(blo
ckX+1)*256
160 pyX = ?(blockX+2) + ?
(blockX+3)*256
170 cxX = ?(blockX+4) + ?
(blockX+5)*256
180 cyX = ?(blockX+6) + ?
(blockX+7)*256
190 PLOT plot%, cxX, pyX
200 PLOT plot%, pxX, pyX
210 PLOT plot%, pxX, cyX
220 PLOT plot%, cxX, cyX
230 ENDPROC
```

Program IV

```
10 REM PROGRAM V
20 FOR modeX = 0 TO 6
30 MODE modeX
40 PRINT "Logical Physic
al Colour Table for Mode ";
modeX
50 FOR logcolX = 0 TO 15
60 phycolX = FNpalette(l
ogcolX)
70 PRINT logcolX, phycol
X
80 NEXT
90 g%=GET
100 NEXT
110 END
120 DEFFNpalette(logicalX
)
130 oswordX = &FFF1
140 blockX = &70
150 X% = blockX MOD 256
160 Y% = blockX DIV 256
170 A% = 11
180 ?blockX = logicalX
190 CALL oswordX
200 = ?(blockX+1)
```

Program V

```
block%  YX     logical colour
        YX+1   physical colour
        YX+2   0
        YX+3   0
        YX+4   0
```

Table IV: Osword 11 to read the palette

```
  10 REM PROGRAM VI
  20 DIM palette% &20
  30 FOR opt% = 0 TO 3 STE
P 3
  40 P% = palette%
  50 [ OPT opt%
  60 LDA &70
  70 CMP# 16 : BPL rts%
  80 LDA &71
  90 CMP# 16 : BPL rts%
 100 LDA# 0
 110 STA &72
 120 STA &73
 130 STA &74
 140 LDA# 12
 150 LDX# &70
 160 LDY# 0
 170 JSR &FFF1
 180 .rts% RTS
 190 ]
 200 NEXT
 210 ?&70 = 1
 220 ?&71 = 3
 230 CALL palette%
 240 REM equivalent to VDU
19,1,3,0,0,0
```

Program VI

the 16 logical colours in each of the seven modes. The function FNpalette requires the logical colour and uses an Osword call to return the value of the physical colour.

The parameter block of Osword call 11 has only two essential elements – the first is set before the call is made and the second is the corresponding physical colour. The rest of the block contains zeros to pad it out as shown in Table IV.

The final program this month enables machine code programmers to change the physical colour of the palette.

Program VI contains an assembly routine that uses the values placed in &70 and &71 to carry out the equivalent of a VDU 19 command.

Lines 70 and 90 check that the values located in &70 and &71 are less than 16, and if they are not the routine aborts. The padding zeros are then added (lines 100 to 130) and lines 140 to 170 set up and make the call.

This example of its use sets &70 to 1 and &71 to 3. That's equivalent to VDU 19, 1, 3, 0, 0, 0 and turns the screen text yellow in Mode 6. To change the background colour to blue set &70 to 0 and &71 to 4.

● *Next month we'll look at the use of the final five Oswords. I'll show how to set up a clock that runs continually, even when the computer is doing other things.*

We will also develop an input routine that you can use in your assembly language programs.

MicroLink
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TELECOM GOLD

No. 10 June 1986

NEWSLETTER

MICROLINK TRANSFERS SPACE PROBE DATA

MICROLINK has been chosen to provide vital transatlantic communications for a project that will eventually push back the frontiers of space even further.

An organisation called Astra – Association in Scotland To Research into Astronautics – is experimenting with the design of a spacecraft that could travel millions of miles hopping from planet to planet and still survive a close encounter with the sun.

It is based on a concept known as Waverider, originated 20 years ago at Glasgow University by Professor Terence Nonweiler, where the vehicle flies at hypersonic speeds on the shock waves produced by its leading edges.

The project has attracted the attention of the Jet Propulsion Laboratory of the University of California which is working with NASA on Starprobe, a mission to fly within two miles of the sun.

The Americans see Waverider as the most serious contender for the role of Starprobe transporter because it can travel far into space by leaping from one planet to another, harnessing the gravitational force of each in the manner of a slingshot.

A leading member of the Starprobe team, James Randolph, has been to Scotland to see the work in progress. "Waverider is an ideal solution, perhaps the only one, to the problem of finding a vehicle with a high lift-to-drag ratio", he said after his inspection.

MicroLink's role in the project is to act as a fast and efficient medium for transmitting information from Astra in Scotland to the Jet Propulsion Laboratory in California.

Airlines guide goes on-line

AIRLINE travellers with a subscription to MicroLink have entered an era of trouble-free and more economical flight arrangements.

The reason is that MicroLink now provides instant round-the-clock information from the bible of globetrotters, the International Official Airlines Guide.

Known as OAG, it offers the very latest data from more than 750 airlines world-wide, with details of 1½ million flights.

MicroLink subscribers can be connected within seconds via satellite to the OAG computer in Oak Brook, Illinois, which monitors the 38,000 changes in fares which take place daily, and the 30,000 weekly schedule revisions.

And OAG is a real money-saver because all the fares for each airline on any given route are accessible from the lowest to the highest.

The service also boasts an elapsed time feature which takes into account any stopover time during flights, thus enabling the passenger to select the journey with the shortest possible duration.

The OAG service is easy to use. It will accept full spellings or airline codes of destinations, and the user can select information either by single line entries or by using prompts on the system.

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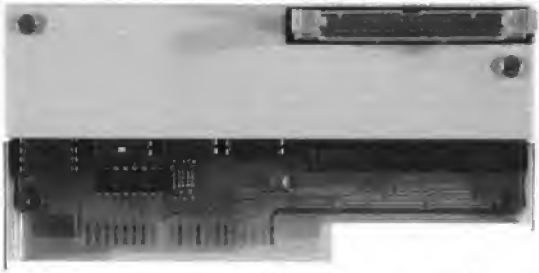

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Disc drive compatibility at long last

ROLAND WADDILOVE reviews the Plus 4 from ACP

PLUS 4, from Advanced Computer Products, is yet another disc system for the Electron. There are already three, the Plus 3 from Acorn, Cumana's interface and Solidisk's, so why bring out another?

Well, each has its own advantages and disadvantages. Each works in a different way and one are compatible with each other.

This means, for instance, that if you have one disc system you can't swap discs with a friend who has a different system – without a lot of hassle, that is.

ACP's offering is an Acorn cream coloured interface that plugs into one of the Plus 1's ROM cartridge sockets.

It's the same height and depth as an ordinary cartridge but about twice the width, making it quite a neat unit since most of it disappears into the cartridge slot.

This is more important than you might think because unfortunately once you start to expand your Electron you'll find it can take up quite a large amount of desk space.

Believe me, that old joke about the Electron becoming so big that it's falling off the back of the table is true.

At the rear of the Plus 4 is a standard socket to take a disc drive, identical to the one on a BBC Micro.

You can use 40 or 80 track 3½ or 5¼in drives, double or single sided, provided they have their own power supply, so there is plenty of choice.

On opening up the Plus 4 you'll find four sockets, three are filled and one empty.

A WD 1770 disc controller is fitted in the first. It's quite popular since it is relatively cheap and can be used in single or double density mode, which crams more on a disc.

This is the same as used in the Plus 3, BBC B+ and the new Master series.

Next comes a standard ROM socket. ACP will tell you it's for ADT, their Advanced Disc Toolkit ROM, but it can be used with any available Electron ROMs.

The third socket is fitted with ACP's 1770 DFS. This is virtually identical to the DFS used in the BBC B+ and Master and is designed to be as compatible as possible with the old Intel 8271 disc controller and DFS used in the ordinary BBC Micro.

This means that the disc controller is restricted to single density mode and the DFS restricts the number of files on a disc to 31. Directory names are single character only and filenames are up to seven characters.

The advantage of this compatibility is that it is possible to save a program to disc on your Electron, put the disc into a drive connected to a BBC Micro and load it straight in, and vice versa.

The discs used are identical so there's no problems with swapping unprotected software.

You'll find a full review of ACP's 1770 DFS in the February 1986 issue of *Electron User*.

The last socket in the Plus 4 is fitted with a 6264 8k static RAM chip. This is used exclusively by the DFS and isn't an addition to the ordinary RAM available to Basic.

Although it doesn't provide you with any extra memory the important advantage of this system is that you don't lose any.

All disc filing systems require some workspace in which to operate. For instance, the ADFS in the Plus 3 requires about 4k which is grabbed from the free memory available to Basic.

This can pose a problem when running programs in Modes 0, 1 and 2 as it is all too easy to run out of memory.

With ACP's Plus 4 fitted PAGE stays fixed at &E00 so you've got exactly the same free memory as before. Those long programs that ran from tape will run from disc without any modification and without the need for downloaders.

An added bonus is that if you can beg, steal or borrow the ADFS ROM out of a Plus 3 then you've got both ADFS and DFS, enabling you to access both Electron Plus 3 discs and BBC discs.

PAGE is set to &1D00 by the ADFS, but you can reset it to &E00 and use the DFS instead.

The Plus 4 has been in use in the office for some time and has performed perfectly. I can't fault it.

VERDICT: Weighing up the advantages and disadvantages of all four disc systems currently available for the Electron, I think ACP's Plus 4 comes out on top. I can recommend it to anyone contemplating upgrading to disc.

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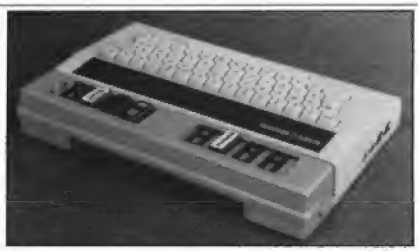

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A better way to handle those calculations

PETE BIBBY describes how to write your own functions

BY now you are probably used to writing your own programs or, at least, trying to figure out how other people's programs work. Or, if you're like me, trying to understand how my own programs work.

And, as you might expect from anything to do with computers, you'll find that they consist of a lot of calculations. Even arcade games which seem to have no sums in sight, have maths lurking in the background.

Often the same calculation is done over and over, only the actual figures involved changing. Program I gives a wonderfully trivial calculation.

```
10 REM Program I
20 PRINT "Give me a numb
er"
30 INPUT number
40 double=2*number
50 PRINT double
```

Program I

All it does is to take a number from the keyboard and double it, displaying the result. However, simple though it be, it is an example of a calculation.

Program II shows another way of doing the same thing, except now it uses a user-defined function, the subject for this month.

```
10 REM Program II
20 PRINT "Give me a numb
er"
30 INPUT number
40 PRINT FNdouble
50 END
60 DEF FNdouble
70 =2*number
```

Program II

The first few lines are easy enough. They ask for and accept a number. However, now there's an FNdouble lurking in the listing. And FNdouble is a function.

We've already dealt with numeric functions, using the ones ready made for us in the Electron's BBC Basic such as INT, COS, and DEG. What they have in common is that when they're used they all give a number as a result.

Now those awfully clever people at Acorn put as many standard functions into BBC Basic as they could. Not only that, they allowed programmers to make up their own functions, and this is where the DEF and FN of Program II come into play.

The Electron works its way down the listing and comes to line 40. Here it's told to PRINT FNdouble. From the name – the FN is a dead giveaway – it knows that it is to use a function which will give it a number to display, as is a function's wont.

The letters immediately after the FN name the function. However, unlike the functions we've used so far, the micro doesn't have FNdouble in its Basic.

This doesn't defeat our Electron, which realises, because of the FN, that it is a user-defined function that it has to deal with.

So it starts looking through the rest of the listing for the lines that define the function. And it finds FNdouble defined by lines 60 and 70.

The DEF of line 60 tells the micro that what follows is a function definition. The FNdouble names the function. And the next line actually shows how the result of that function is worked out.

It's a weird looking line, with the equals sign, =, as its first character. This forlorn-looking sign is one of the characteristics of a user-defined function. It tells the micro what the function DEFined in the previous lines is to be made equal to.

It marks out the place that the Electron looks to for the value that the function will return. In this case it's easy to see that the function will take a value that is twice whatever *number* is.

This may not seem all that much of an improvement on Program II, and in fact it isn't, but once you've defined a function it can be called from all over the program.

Hence in a longer program we could call FNdouble from all over the place with different values of *number*. We wouldn't have to show the micro how to do the calculation each time.

Notice that I've placed the function definition right at the end of the program. In fact I've put it after the END of line 50.

The function definition could, in fact, go anywhere, but it's good practice to put it at the end of the program out of harm's way. Also it's easier to find!

The END is necessary to stop the main program running into the function definition and trying to execute those lines. Try omitting line 50 and you'll see the result. The micro gets very confused. As it is, the END stops this.

It may seem strange to have some lines after the END. How does the program get to them if it's stopped at line 50?

The answer is that when line 40 calls the function, these lines are obeyed and then the program carries on from the line following the one that called the function. In this case it's the END, which stops everything.

You can look on the function definition as the appendix to a book. Whenever the program comes across a reference to a user-defined function it looks to the function definitions at the end of the listing to see what it has to do.

Before we leave Program II for good, after all that talk about the equals sign of line 70 showing the value that is given to the function, I have to admit that a simple:

```
60 DEF FNdouble=2*number
```

would do the job just as well. And it's easier to follow. However, functions aren't always as simple as this, as a quick look at Program III will convince you.

This uses a function to

```
10 REM Program III
20 PRINT "Tell me height
, base"
30 INPUT height,base
40 PRINT FNarea
50 END
60 DEF FNarea
70 area=height*base
80 =area
```

Program III

calculate the area of a rectangle. Lines 10 to 30 collect its details, storing them in the variables *base* and *height*. And line 40 calls the function FNarea and displays the result.

Now let's have a look at the lines that define the function, lines 60 to 70.

Line 60 is straightforward enough. The DEF signifies that the lines that follow define a function while the FNarea names it.

Likewise, line 80 should hold no problems. The fact that it begins with an equals sign shows that when it is called the function FNarea is to be given the value held in the variable *area*.

But what of the line in the middle, line 70? This calculates the value of *area*. *height* and *base* are multiplied together and the product stored in *area*. In effect, line 70 is a scratchpad where the Electron does its calculations.

In this example the calculation is quite simple, and the last lines could be replaced by:

```
60 DEF FNarea
70 =height*base
```

or even:

```
60 DEF FNarea=height*base
```

However the point to grasp is that lines between the DEF and the final line – the one beginning with an equals sign – can be used to do the calculations involved in working out the function's result.

The last line takes whatever is to the right of the equals sign and assigns that value to the function.

In this case there was only one, trivial, line sandwiched between the boundaries of the function. However it's not hard to imagine cases where more complicated calculations are done in the scratchpad area.

Suppose there was a call for a function FNtax which calculated the tax payable on a certain income.

The lines between the DEF and the final equals sign would be full of calculations and IF statements as various allowances and tax thresholds were allowed for.

And at the end of it all, the bottom line, that strange looking line beginning with the equals sign takes the result of all this and gives the value to the function.

Looking back to our use of Basic's standard functions, you'll remember that we could use parameters with them. These were the numbers, or numeric variables, in the brackets following the function name.

They gave the function the values it was to work on to produce its result. You might ask if we can do the same thing with our user-defined functions and the answer is that we can, as Program IV shows.

```
10 REM Program IV
20 PRINT "Tell me height
, base"
30 INPUT height,base
40 PRINT FNarea(height,b
ase)
50 END
60 DEF FNarea(height,bas
e)
70 area=height*base
80 =area
```

Program IV

The first three lines echo Program III. But now the function called is FNarea (height,base). The numeric variables *height* and *base* are the parameters of the function.

The Electron is told to expect these parameters by the function definition of line 60. Here the function name is followed by the parameters that have to be used.

Now the micro knows that if the function is called by, say:

```
FNarea(3,4)
```

the value 3 is to be given to the variable *height* and 4 to the variable *base*. These are then used in the subsequent calculations and the result given back to the function by line 80.

Notice that the values inside the brackets when the function is called are matched one-to-one with the variable names in the brackets following the function definition.

Now there are two parts to getting a function to work. One is the function definition which shows the micro what to do.

However this doesn't do anything in itself. It has to be called by the main program and, if necessary, supply values to take the place of the variables in the function definition. This is the second part.

Then the micro gets cracking with its calculation. Bearing this in mind, have a look at Program V which might, at

```
10 REM Program V
20 PRINT "Tell me height
, base"
30 INPUT width,length
40 PRINT FNarea(width,le
ngth)
50 END
60 DEF FNarea(height,bas
e)
70 area=height*base
80 =area
```

Program V

first sight, appear a little confusing.

It may seem that there are two functions involved. Line 40 has FNarea(width,length) while the function definition of line 60 has FNarea(height, base). However it's simpler than it seems. I doubt if you'd have any problems if line 40 was:

```
40 PRINT FNarea(7,10)
```

From this it's obvious that when the program goes to the function definition to find out what to do, 7 will be given to the variable *height*, 10 to *base*. And the following calculations will use those values. It's the same with the:

```
40 PRINT FNarea(width,
length)
```

What the program does is to take the values that line 30 has given to *width* and *length* and make these the parameters of the function. So if *width* were 15 and *length* 20, then line 40 effectively becomes:

```
40 PRINT FNarea(15,20)
```

Now when the program looks to the function definition, *height* takes the value 15, *base* 20.

As the values are taken from one set of variables, made parameters for a function call, whose values are then given to variables used to work out the value of the function, it's reminiscent of passing the parcel.

In fact this operation is known as passing parameters, and we'll be looking at it in more detail when we come to procedures. For the moment, however, let's look at Program VI, a last example of functions at work.

It's quite simple, just being used to calculate the VAT and hence the total price of an item. And there's not a parameter in sight!

Notice how the procedure definition has two lines of calculations, 70 and 80. The first works out the VAT

```
10 REM Program VI
20 PRINT "What is price
excluding VAT?"
30 INPUT price
40 PRINT "The all-in pri
ce is ";FNallIn
50 END
60 DEF FNallIn
70 vat=price*0.15
80 total=price+vat
90 =total
```

Program VI

payable, the second adds this to the basic cost of the item, storing the result in the variable *total*. The final line sets the value of the function FNallIn to the value of *total*.

And that's where we leave user-defined functions. Try making up some of your own for, say, calculating compound interest over a number of years or your age in days or weeks. Remember, if you find that you're writing a program that does the same calculation repeatedly with different figures, then a function may be a better way of handling things.

● *Next month we'll be looking at how subroutines function.*

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SIMPLE screen dumps were featured in the March 1985 issue of *Electron User*. Another program was published in Micro Messages in May 1985.

With these and a dot matrix printer you can make permanent pictorial records of a monochrome screen display. Line drawings and text come out especially well.

But what if the screen picture is in colour? Like early customers of Henry Ford, can we choose any colour – as long as it's black?

We are used to thinking of the Electron screen as a two dimensional array of pixels 640 columns x 256 rows in Mode 0, 320 x 256 in Modes 1 and 4, and 160 x 256 in Modes 2 and 5.

When a dot matrix printer is operating in bit image mode under the control of a screen dump program, the paper may be thought of in the same way.

It's as if a defined rectangular area of the paper were covered with minute rectangles like a sheet of graph paper. Each printer pixel can be made black (if the pin in the printer head covering it is instructed to fire) or left blank (white).

In the simple dump I wrote primarily for Modes 1 and 4 (in the May 1985 issue) the relation between paper and screen was of the simplest – one dot position on the paper equalled one Mode 1/4 pixel on the VDU.

Because in normal density bit image printing with the Shinwa/CTI CP-80 printer the horizontal spacing between dots is the same as the vertical spacing – which is fixed by the dimensions of the print head – this one-to-one correspondence gave accurate printouts (for instance circles came out as circles, not elipses) with a picture size of 3.75 x 3 inches.

Not much joy here, you may say, since a pixel can be printed only as black or white. Actually, with a dump written in Basic this isn't entirely so.

You can use the RND function to get a pixel in a certain colour printed in black half the time on average, or a quarter of the time, so giving a darker or lighter grey appearance to areas of the paper.

But this is difficult in faster machine code programs, and we have to rely on distribution in space, rather than in time.

So let's double the size of the printed picture area to 7.5 x 6 inches, still a convenient size for A4 paper.

Now we again have 320 x 256 pixels on the Mode 1 screen – but 640 x 512 printer pixels available on paper.

Each screen pixel is represented on paper by four dots (::). We can arrange that for different colours of a screen pixel the printer responds by printing:

0 dots – white
4 dots – black
3 dots – dark grey
2 dots – medium grey
1 dot – light grey

With two dots we can choose a horizontal or vertical striped effect, or medium grey pepper-and-salt. In this way differently coloured areas of the screen are represented on paper by black-and-white areas which differ in shade and/or texture.

You can see that the choices are adequate to cope with the four colours available in Mode 1.

Of course the real test is Mode 2 with its 16 colours. With 640 x 512 dots to represent the 160 x 256 pixel screen, there are 8 dots (::::) per pixel – and 256 different ways of choosing a pattern.

Unfortunately many of these patterns are the same, as you will see if you type in and run Program I, *Design*, which shows, greatly enlarged, the patterns that can be made with eight dots to play with.

Even with patterns that are different, the eye often can't distinguish them.

So the flashing colours, logical numbers 8-15, are represented on paper as if they were the non-flashing colours 0-7.

This is done by ANDing the logical colour value with &07. That leaves eight patterns to choose, not too difficult a task.

In the machine code dumps *UCode* generated by Program II, *UDump*, information defining the patterns is stored in eight bytes of memory at the beginning of the program. This means that they can easily be altered.

How is this information translated into dots printed on paper? Essentially a screen dump program is a means whereby the graphics cursor is moved systematically to interrogate each pixel on the screen in turn, and return information about its state of illumination in the form of the logical colour number.

This is obtained by calling the operating system routine Osword with the accumulator set to 9, the machine code equivalent of the Basic function POINT.

A further call to Osword with A set to 11 will give data on the actual colour, but there's not much point in this as patterns have to be chosen to suit the particular screen display you wish to copy.

The cursor is moved in a manner which imitates the way the print head of the dot matrix printer travels across the paper, and as the print head has a vertical row of eight pins, in *UCode* dumps a column of four pixels is

```
  10 REM Program I
  20 REM Design
  30 DIM bit(7)
  40 MODE6
  50 VDU23,225,255,255,255,255
,255,255,255,255,255,255
  60 INPUT TAB(0,5);"Enter
 a number in hex (00 to FF)
: &"byte$
  70 byteZ=EVAL("&"+byte$)
  80 B$="":BI=byteZ
  90 FOR IZ=0 TO 7
 100 IF BI MOD 2 THEN B$="
1"+B$:bit(IZ)=225 ELSE B$="
0"+B$:bit(IZ)=32
 110 BI=BI DIV 2
 120 NEXT IZ
 130 PRINT TAB(0,10);"You
have entered"
 140 PRINT''TAB(10);"&";byt
e$;" = ";byteZ;" = ";B$
 150 PRINT TAB(20,20);"Pre
ss SPACE"
 160 G=GET: IF G<>32 THEN
VDU7:GOTO160
 170 :
 180 MODE 4
 190 VDU19,0,3;0;19,1,0;0;
 200 FOR i=2 TO 20 STEP 2
 210 PRINT TAB(0,i);"
";
 220 FOR j=0 TO 6
 230 PRINT CHR$bit(0);CHR$
bit(2);CHR$bit(4);CHR$bit(6
);:NEXT
 240 PRINT TAB(0,i+1);"
";
 250 FOR j=0 TO 6
 260 PRINT CHR$bit(1);CHR$
bit(3);CHR$bit(5);CHR$bit(7
);:NEXT
 270 NEXT i
 280 G=GET:IF G=ASC("Q") T
HEN VDU7:MODE6:PRINT TAB(6,
12);"E N D  O F  P R O G R
A M":END ELSE IF G<>32 THEN
 280
 290 GOTO 40
```

Program I: Design

examined before the cursor shifts to the right across the screen.

The logical colour value is used as an index, pointing to which pattern is to be transferred to the accumulator.

Thus if the colour is 4, the pattern stored at &900+4 goes into the accumulator. If this pattern corresponds to the hex number &55, we have in the accumulator:

Bit	7	6	5	4	3	2	1	0
	0	1	0	1	0	1	0	1

To store this information in proper order until it can be sent to the printer, four bytes of memory are reserved starting at location *octet*.

The instruction LSR A shifts bit 0 of the accumulator into the carry, leaving 00101010 in A, and ROL *octet* moves the 1 in the carry into bit 0 of the first storage byte *octet*.

A repetition leaves 00010101 in A, with bit 0 of *octet* equal to 0 and bit 1 equal to 1.

This operation is repeated, but now the next two bits go to location *octet*+1, and so on, until the 8 bits of the pattern have all been transferred to bits 0 and 1 of the four storage bytes.

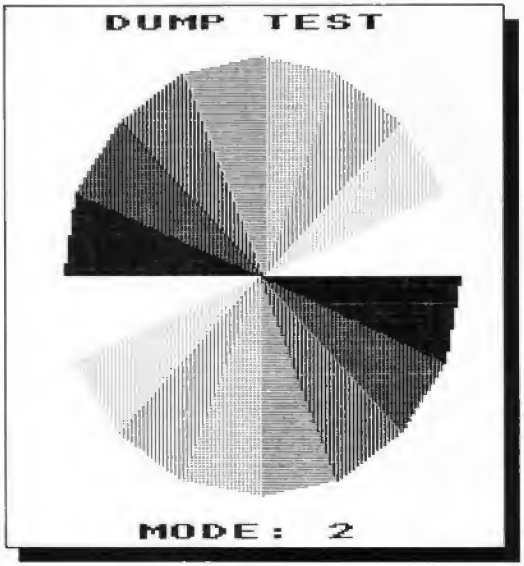
The same happens with the next pixel, and the next, and the next – and now all the bits of the four bytes *octet* to *octet*+3 contain information on pixel colour, and this is transferred to the printer buffer.

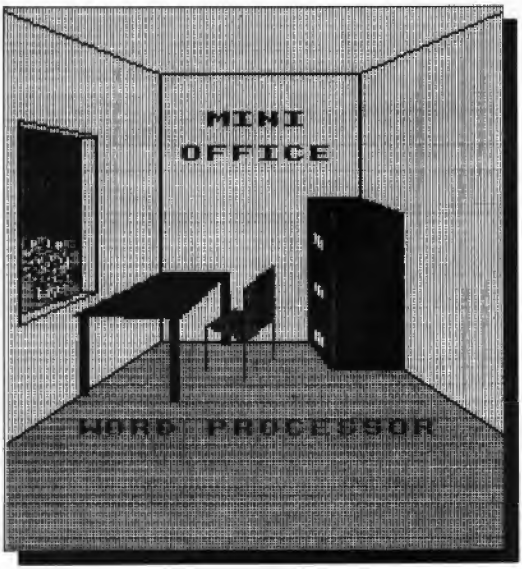
If all four pixels return colour 4, what gets printed is:

1	1	1	1	
				pixel 1
0	0	0	0	
1	1	1	1	
				pixel 2
0	0	0	0	
1	1	1	1	
				pixel 3
0	0	0	0	
1	1	1	1	
				pixel 4
0	0	0	0	

where 1 means the printer makes a black dot on the paper and 0 that the paper is blank.

In Modes 1 and 4 only two bytes are prepared for printing.





```
  10 REM Program II
  20 REM UDump
  30 REM Screen dump with
patterns for Shinwa
  40 :
  50 oswrd=&FFF1:oswrch=&
FFEE:osbyte=&FFF4
  60 Xlo=&70:Xhi=&71:Ylo=&
72:Yhi=&73
  70 YYlo=&80:YYhi=&81
  80 tint=&74:count=&75:oc
tet=&76
  90 pattern=&900:set=patt
ern+8:pix=pattern+7
 100 :
 110 MODE6:INPUT TAB(12,12
)"Enter MODE: "mode
 120 IF mode >=6 VDU7:GOTO
 110
 130 M=mode+1:ON M GOTO 15
0,160,170,180,190,200
 140 :
 150 PROC0:GOTO 220
 160 PROC1:GOTO 220
 170 PROC2:GOTO 220
 180 VDU7:GOTO 110
 190 PROC4:GOTO 220
 200 PROC5:GOTO 220
 210 :
 220 code=pattern+10
 230 FOR pass=0 TO 3 STEP
3
 240 P%=code
 250 [OPT pass
 260 LDA #26:JSR oswrch  \
Set default screen
 270 LDA #2:JSR oswrch  \P
rinter on
 280 .clear JSR next
 290 .line JSR esc
 300 LDA #65:JSR oswrch
 310 LDA #1:JSR oswrch
 320 LDA #8:JSR oswrch  \S
et line spacing
 330 .load LDA #252:STA YY
lo
 340 LDA #3:STA YYhi \Star
t Y=1020
 350 .newl LDA #0:STA Xlo
 360 STA Xhi  \Start X=0
 370 .bit JSR esc
 380 LDA #75:JSR oswrch
 390 LDA #1:JSR oswrch
 400 LDA #128:JSR oswrch

 410 LDA #1:JSR oswrch
 420 LDA #2:JSR oswrch \64
0 dots per line
 430 .start LDA #4:STA cou
nt
 440 LDA YYlo:STA Ylo
 450 LDA YYhi:STA Yhi
 460 .test LDI &470:LDY #0
:LDA #9
 470 JSR osword  \Logical
colour returned in &74
 480 LDA tint:AND #7:TAY \
Logical colour used as inde
x to pattern
 490 .byte LDI #0
 500 LDA pattern,Y
 510 .loop1 LSR A:ROL octe
t,X \ROL requires X registe
r
 520 LSR A:ROL octet,X  \
2 bits transferred from pat
tern to each byte in turn
 530 INX:CPX set
 540 BNE loop1
 550 .loop2 DEC count
 560 BEQ print
 570 LDA Ylo
 580 SEC:SBC #4
 590 STA Ylo
 600 LDA Yhi:SBC #0
 610 STA Yhi
 620 JMP test
 630 .print LDI #0
 640 .loop3 LDA #1:JSR osw
rch
 650 LDA octet,X:JSR oswrc
h
```

Program II: UDump

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so that only bits 0 to 3 of the pattern bytes are used. Only two bits function in Mode 0 with one byte sent per pixel.

Type in the dump generator Program II and save it.

When it is run it asks for the number of a graphics mode to be entered, after which the appropriate machine code dump will be saved with the name *Udump* followed by the selected mode number.

Plus 3 owners should make sure that a disc is in the drive and has been *MOUNTed.

In order to use the saved code – supposing it's Mode 5 you are interested in:

```
*LOAD UCODE5
```

will put the code into memory starting at &900. If you prefer another location substitute:

```
*LOAD UCODE5 A00
```

or whatever. Avoid page &0D (&0D00), though, if you have a Plus-1 fitted as some locations are involved with printer operation. The dump can be tucked away below PAGE as follows:

```
PAGE=&F00
*LOAD UCODE5 E00
```

This is convenient as a change of mode doesn't alter PAGE as it does HIMEM. Plus 3 owners could raise PAGE to &1E00 and place the code at &1D00.

Now run Program III, *Anymode*, and switch on the printer. Answer Y to "Has the dump been loaded?" – and in 10 minutes (with the CP-80) a sectored disc is printed which shows what the different patterns look like.

Anymode demonstrates two ways of loading and running a dump.

One is to load the dump in Mode 6, and then run the graphics program, into which has been inserted CALL &90A (load address + &0A), the "execution address" of the machine code program.

The second is to run the graphics program, which itself loads and runs the dump with *RUN.

Tape owners should note that *OPT1,0 must be included to stop messages referring to cassette loading ruining the screen display you want to copy, and *FX16,0 is relied on to allow the program to load in Modes 0, 1 and 2.

Well, now you've seen them, you don't like the patterns? They're easy to change.

```
PRINT ?!&900
```

and:

```
PRINT ?!&904
```

will show you what you've got and:

```
!&900=&33221100
```

followed by:

```
!&904=&77665544
```

will change them. The figures 00,11 and so on stand for hex numbers in the range &00 to &FF (Mode 2/5); &00 to &0F (Mode 1/4); and &00 to &03 (Mode 0).

Program IV, *Pattern* will help you decide on suitable patterns. To use this program the appropriate *UCODE* dump must be loaded at &900 since the contents of certain addresses are altered to make the dump scan only the lower third of the screen.

This means the printout takes only three minutes as against 10 for *Anymode*, and 30 patterns cover only one A4 page.

As two patterns must be reserved to make the legend print black-on-white, only six experimental patterns are printed per trial. When printing stops, press the spacebar to continue and Q to exit from the program.

The first instruction in the *UCode* dump corresponds to VDU 26, which sets the graphics origin to the bottom left-hand corner, while graphics and text windows cover the whole screen.

Put a display with windows on to the screen and dump it to the printer with CALL &90F, which misses out VDU 26. Some funny things can happen!

If your paper is less than eight inches wide Program V, *Sidedump* may interest you – the picture is printed sideways, 6 inches across by 7.5 inches deep.

However most difficulties are liable to arise because you have a printer with characteristics which differ from those of the CP-80. The programs assume the following:

- 640 dots can be printed in one line across the page.
- The command for this is ESC K n1 n2 where no. of dots = 256*n2 + n1 (VDU1,27,1,75,1,128,1,1).
- The vertical spacing of dots (distance between dot wires) is the same as the horizontal spacing.
- The correct line feed spacing with no gap or overlap between lines is set with ESC A 8 (VDU1,27,1,65,1,8).

If this doesn't apply to your printer, some surgery is needed – but the patient should survive.

Epson FX series dot matrix

→

```
  660 INX:CPX set
  670 BNE loop3
  680 .xloop LDA Xlo
  690 CLC:ADC pix
  700 STA Xlo
  710 LDA Xhi:ADC #0
  720 STA Xhi  \Increment X
to next pixel
  730 CMP #5  \End of line?
(X=1280)
  740 BNE start
  750 JSR next  \Start new
line
  760 .yloop LDA YYlo
  770 SEC:SBC #16
  780 STA YYlo
  790 LDA YYhi:SBC #0
  800 STA YYhi  \Down 4 pix
els
  810 BCC end  \Finish when
 Y reaches 0
  820 JMP newl \Otherwise c
ontinue
  830 .end LDA #1:JSR oswrc
h
  840 LDA #7:JSR oswrch  \B
eep
  850 JSR esc
  860 LDA #64:JSR oswrch \R
eturn printer to default se
tting
  870 LDA #3:JSR oswrch  \A
nd printer off
  880 RTS
  890 .esc LDA #1:JSR oswrc
h
  900 LDA #27:JSR oswrch
  910 LDA #1:JSR oswrch
  920 RTS
  930 .next LDA #1:JSR oswr
ch
  940 LDA #10:JSR oswrch
  950 RTS
  960 ]
  970 NEXT pass
  980 CLS:PRINT''"End of co
de &";~P%
  990 PRINT''
 1000 OSCLI"SAVE"+" "+file$
+" "+STR$~pattern+" "+STR$
~&FF+" "+STR$~code
 1010 END
 1020 :
 1030 DEFPROC0
 1040 !pattern=&FFFFFF00:!(
pattern+4)=&00000000
 1050 ?set=1:?pix=2:file$="
UCODE0"
 1060 ENDPROC
 1070 :
 1080 DEFPROC1
 1090 !pattern=&FF119900:!(
pattern+4)=&00000000

 1110 ?set=2:?pix=4:file$="
UCODE1"
 1110 ENDPROC
 1120 :
 1130 DEFPROC2
 1140 !pattern=&01119900:!(
pattern+4)=&FFC35557
 1150 ?set=4:?pix=8:file$="
UCODE2"
 1160 ENDPROC
 1170 :
 1180 DEFPROC4
 1190 !pattern=&FFFFFF00:!(
pattern+4)=&00000000
 1200 ?set=2:?pix=4:file$="
UCODE4"
 1210 ENDPROC
 1220 :
 1230 DEFPROC5
 1240 !pattern=&FF119900:!(
pattern+4)=&0000
 1250 ?set=4:?pix=8:file$="
UCODE5"
 1260 ENDPROC
```

```
   10 REM PROGRAM III
   20 REM Anymode
   30 REM Test Card
   40 :
   50 MODE6:INPUT TAB(5,10)
"Mode: "mode
   60 IF mode=3 OR mode)=6
VDU7:GOTO 50
   70 INPUT TAB(5,10);"Has
dump been loaded? (Y/N) "A$
:IF A$<>"Y" AND A$<>"N" VDU
7:GOTO 70
   80 MODE mode
   90 file$="UCODE"+STR$mod
e
  100 J=1+mode MOD 3
  110 ON J GOTO 120,140,160
  120 PRINT TAB(32,1);"D U
M P  T E S T"
  130 PRINT TAB(34,30);"M o
d e : "mode:GOTO 180
  140 PRINT TAB(15,1);"DUMP
 TEST"
  150 PRINT TAB(16,30);"Mod
e: "jmode:GOTO 180
  160 PRINT TAB(5,1);"DUMP
TEST"
  170 PRINT TAB(6,30);"MODE
: "jmode:GOTO 180
  180 MOVE 140,1012:DRAW 11
40,1012:DRAW1140,12:DRAW 14
0,12:DRAW 140,1012
  190 :
  200 PROCpolygon(640,512,4
00,15)
  210 :
  220 IF A$="N" THEN GOTO 2
50
  230 CALL &90A
  240 END
  250 *OPT1,0
  260 *FX16,0
  270 OSCLI"RUN"+" "+file$
  280 *OPT1,1
  290 END
  300 :
  310 DEFPROCpolygon(PX,QX,
RX,sX)
  320 MOVE PX+RX,QX
  330 FOR NX=sXTO 240 STEP
sX
  340 GCOL0,NXDIVsX-1
  350 MOVE PX,QX
  360 XX=RX*COS(NX*PI/120)
  370 YX=RX*SIN(NX*PI/120)
  380 PLOT85,XX+PX,YX+QX

  390 NEXT
  400 :
  410 ENDPROC
```

Program III: Anymode

```
   10 REM PROGRAM IV
   20 REM Pattern
   30 REM Tests patterns fo
r dumps
   40 :
   50 ?&92A=44:?&92E=1
   60 REM To start at Y=300
   70 REM Y MOD16 must=12 t
o avoid line at bottom of s
creen
   80 :
   90 MODE 6
  100 PRINT'''   Enter Four
 bytes"''   ";STRING$(16,"-
")'''"** Must be ZZYYXX[00]"
'''   if background is to b
e white"
  110 PRINT TAB(3,11) STRIN
G$(23,"=");INPUT TAB(3,18)"
!pattern    : &"A$
  120 !&900=EVAL("&"+A$)
  130 PRINT'''   Enter Four
 bytes"''   ";STRING$(16,"-
")'''"** Must be [FF]ZZYYXX"
'''   if lettering is to be
 black"
  140 PRINT TAB(3,22) STRIN
G$(23,"=");INPUT TAB(3,21)"
!(pattern+4): &"B$
  150 !&904=EVAL("&"+B$)
  160 A$=B$+A$
  170 MODE 2
  180 MOVE 0,200:DRAW 1200,
200
  190 FOR j=0 TO 7
  200 GCOL0,j
  210 MOVE 20+150*j,256
  220 MOVE 20+150*j,156
  230 PLOT85,120+150*j,256
  240 PLOT85,120+150*j,156
  250 NEXT
  260 VDU5
  270 FOR i=1 TO 8
  280 MOVE 20+150*(i-1),100

  290 PRINT RIGHT$(A$,2)
  300 A$=LEFT$(A$,(16-2*i))
  310 NEXT
  320 COLOUR 7:MOVE 0,24:DR
AW 1200,24
  330 CALL &90A
  340 VDU4:CLS:PRINTTAB(8,1
0);"<Q> to end"''"<SPACE> t
o continue"
  350 G$=GET$:IF G$="Q" THE
N VDU7:MODE6:END ELSE GOTO
90
  360 END
```

Program IV: Pattern

```
  10 REM PROGRAM V
  20 REM SideDump
  30 REM Screen dump with
patterns
  40 REM Y horizontal,X ve
rtical
  50 :
  60 osword=&FFF1:oswrch=&
FFEE:osbyte=&FFF4
  70 Xlo=&70:Xhi=&71:Ylo=&
72:Yhi=&73
  80 XXlo=&80:XXhi=&81
  90 tint=&74:count=&75:oc
tet=&76
 100 pattern=&900
 110 !pattern=&FFA50100:!(
pattern+4)=&00000000 :REM M
ode 5
 120 set=pattern+8:?set=4
 :REM 4 bits of pattern int
o each byte in Mode2/5
 130 pix=pattern+9:?pix=8
 :REM pixel 8x4 Mode2/5
 140 code=pattern+10
 150 FOR pass=0 TO 3 STEP
3
 160 P%=code
 170 [OPT pass
 180 LDA #26:JSR oswrch  \
Set default screen
 190 LDA #2:JSR oswrch  \P
rinter on
 200 .line JSR esc
 210 LDA #65:JSR oswrch
 220 LDA #1:JSR oswrch
 230 LDA #8:JSR oswrch  \S
et line spacing
 240 .load LDA #0:STA XXlo
 250 STA XXhi \Start X=0
 260 .newl LDA #0:STA Ylo
 270 STA Yhi  \Start Y=0
 280 .bit JSR esc
 290 LDA #75:JSR oswrch
 300 LDA #1:JSR oswrch
 310 LDA #0:JSR oswrch
 320 LDA #1:JSR oswrch
 330 LDA #2:JSR oswrch \51
2 dots per line
 340 .start LDA #2:STA cou
nt
 350 LDA XXlo:STA Xlo
 360 LDA XXhi:STA Xhi
 370 .test LDX #&70:LDY #0
:LDA #9
 380 JSR osword  \Logical
colour returned in &74
 390 LDA tint:AND #7:TAY \
Logical colour used as inde
x to pattern
 400 .byte LDX #0
 410 LDA pattern,Y
 420 .loop1 LSR A:ROL octe
t \Bits 0,2,4,6 into 1st by
te
 430 LSR A:ROL octet+1  \B
its 1,3,5,7 into 2nd byte
 440 INX:CPX set
 450 BNE loop1
 460 .loop2 DEC count
 470 BEQ print
 480 LDA Xlo
 490 CLC:ADC pix
 500 STA Xlo
 510 LDA Xhi:ADC #0
 520 STA Xhi
 530 JMP test
 540 .print LDX #0
 550 .loop3 LDA #1:JSR osw
rch
 560 LDA octet,X:JSR oswrc
h
 570 INX:CPX #2
 580 BNE loop3
 590 .yloop LDA Ylo
 600 CLC:ADC #4
 610 STA Ylo
 620 LDA Yhi:ADC #0
 630 STA Yhi  \Increasent Y
to next pixel
 640 CMP #4  \End of line?
(Y=1024)
 650 BNE start
 660 .next LDA #1:JSR oswr
ch
 670 LDA #10:JSR oswrch \S
tart new line
 680 .xloop LDA XXlo
 690 CLC:ADC #16
 700 STA XXlo
 710 LDA XXhi:ADC #0
 720 STA XXhi  \Down 8 dot
s
 730 CMP #5:BEQ end  \Fini
sh when X reaches 1280
 740 JMP newl \Otherwise c
ontinue
 750 .end LDA #1:JSR oswrc
h
 760 LDA #7:JSR oswrch  \B
eep
 770 JSR esc
 780 LDA #64:JSR oswrch \R
eturn printer to default se
tting
 790 LDA #3:JSR oswrch  \A
nd printer off
 800 RTS
 810 .esc LDA #1:JSR oswrc
h
 820 LDA #27:JSR oswrch
 830 LDA #1:JSR oswrch
 840 RTS
 850 ]
 860 NEXT pass
 870 CLS:PRINT''"End of co
de &";~P%
 880 PRINT''
 890 *SAVE SCODE5 900 9FF
90A
```

Program V: Sidedump

```
  10 REM PROGRAM VI
  20 REM EDump
  30 REM Screen dump with
patterns
  40 REM Modified for EPSO
N RX-80
  50 :
  60 osword=&FFF1:oswrch=&
FFEE:osbyte=&FFF4
  70 Xlo=&70:Xhi=&71:Ylo=&
72:Yhi=&73
  80 YYlo=&80:YYhi=&81
  90 tint=&74:count=&75:oc
tet=&76
 100 pattern=&900
 110 !pattern=&05050100:!(
pattern+4)=&3F370F15 :REM (
:::) only 6 bits used
 120 set=pattern+8:?set=3
 :REM 3 bytes sent to prin
ter instead of 4
 130 pix=pattern+9:?pix=8
 :REM pixel 2x4 Mode0,4x4 M
odel/4,8x4 Mode2/5
 140 code=pattern+10
 150 FOR pass=0 TO 3 STEP
3
 160 P%=code
 170 [OPT pass
 180 LDA #26:JSR oswrch  \
Set default screen
 190 LDA #2:JSR oswrch  \P
rinter on
 200 .clear JSR next
 210 .line JSR esc
 220 LDA #65:JSR oswrch
 230 LDA #1:JSR oswrch
 240 LDA #8:JSR oswrch  \S
et line spacing
 250 .load LDA #252:STA YY
lo
 260 LDA #3:STA YYhi \Star
t Y=1020
```

Program VI: Edump

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printers can print 72 dots/inch horizontally and vertically, but with only up to 576 dots/line.

The solution is to use the sideways dump with 512 dots/line. The command has to be changed to ESC "*" (5) n1 n2 which means altering line 290 to:

```
290LDA #42:JSR oswrch
```

and inserting a line 295:

```
295LDA #5:JSR oswrch
```

Note the patterns won't have the same values. If the code overruns &9FF delete the beep instruction, lines 750,760.

The popular Epson RX series doesn't have the same spacing horizontally and vertically, so dumps are slightly distorted. For example, circles print as ellipses.

Look at page 50 of the May 1985 *Electron User* where the square drawn on the screen by Demo is printed as a rectangle (1.2 × 1).

Newer models of the RX-80 support 640 dots per 8 inch line, command ESC "*" (4) which must be substituted for ESC K in *UDump*.

Alternatively the ESC K command is retained, which in this printer corresponds to 480 dots per line (60 dots/inch).

The dump generator is rewritten in Program VI, *Edump*, for a field of 480 × 512 dots, giving a six dot pattern (:::) for Mode 2/5.

The number of patterns is cut from 256 to 64, but eight sufficiently different can be squeezed out.

For Mode 1 you would have to switch to dual density bit image printing ESC L, 960 dots/line and put *?pix* equal to 4.

Of course, the supporting programs *Design*, *Anymode* and *Patterns* will need changing too, but this shouldn't present much difficulty. Let me know how you get on.

```
  270 .newl LDA #0:STA Xlo
  280 STA Xhi  \Start X=0
  290 .bit JSR esc
  300 LDA #75:JSR oswrch
  310 LDA #1:JSR oswrch
  320 LDA #224:JSR oswrch
  330 LDA #1:JSR oswrch
  340 LDA #1:JSR oswrch \40
0 dots per line
  350 .start LDA #4:STA cou
nt
  360 LDA YYlo:STA Ylo
  370 LDA YYhi:STA Yhi
  380 .test LDI #&70:LDY #0
:LDA #9
  390 JSR osword  \Logical
colour returned in &74
  400 LDA tint:AND #7:TAY \
Logical colour used as inde
x to pattern
  410 .byte LDX #0
  420 LDA pattern,Y
  430 .loop1 LSR A:ROL octe
t,X \ROL requires X registe
r
  440 LSR A:ROL octet,X  \
2 bits transferred from pat
tern to each byte in turn
  450 INX:CPX #4
  460 BNE loop1
  470 .loop2 DEC count
  480 BEQ print
  490 LDA Ylo
  500 SEC:SBC #4
  510 STA Ylo
  520 LDA Yhi:SBC #0
  530 STA Yhi
  540 JMP test
  550 .print LDX #0
  560 .loop3 LDA #1:JSR osw
rch
  570 LDA octet,X:JSR oswrc
h
  580 INX:CPX #4
  590 BNE loop3
  600 .xloop LDA Xlo
  610 CLC:ADC pix
  620 STA Xlo
  630 LDA Xhi:ADC #0
  640 STA Xhi  \Increment X
to next pixel
  650 CMP #5  \End of line?
(X=1280)
  660 BNE start
  670 JSR next \Start new l
ine
  680 .yloop LDA YYlo
  690 SEC:SBC #16
  700 STA YYlo
  710 LDA YYhi:SBC #0
  720 STA YYhi  \Down 4 pix
els
  730 BCC end  \Finish when
 Y reaches 0
  740 JMP newl \Otherwise c
ontinue
  750 .end LDA #1:JSR oswrc
h
  760 LDA #7:JSR oswrch  \B
eep
  770 JSR esc
  780 LDA #64:JSR oswrch \R
eturn printer to default se
tting
  790 LDA #3:JSR oswrch  \A
nd printer off
  800 RTS
  810 .esc LDA #1:JSR oswrc
h
  820 LDA #27:JSR oswrch
  830 LDA #1:JSR oswrch
  840 RTS
  850 .next LDA #1:JSR oswr
ch
  860 LDA #10:JSR oswrch
  870 RTS
  880 ]
  890 NEXT pass
  900 CLS:PRINT''"End of co
de &";~P%
  910 PRINT''
  920 *SAVE ECODE 900 9FF 9
0A
```

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FISHING

By MICHAEL KELSALL

IN Fishing you have just entered the United Kingdom Fishing Contest and are competing against six top anglers.

You first enter your name and then details of the tackle you will require. Then it's off to the riverside to fish.

The day before the contest the organisers introduce approximately 600lb of fish, of varying weights to the river.

But an hour later they received a phone call from a member of the Organisation Against Cruelty to Fish saying they had put several 40lb pike into the river.

Deciding against postponing the competition, the organisers agreed to warn the anglers before the competition started so you have been supplied with the correct equipment to land these monsters. But beware, they are amazingly strong.

When reeling in any fish you have to tap the key as fast as possible so the heavier the fish the more tiring it will be to reel in.

If, while this is happening, the fish should take the line outside the screen area, you will be fishing in another angler's peg and, as competition is fierce, he will become very irate and cut your line, wasting valuable time.

The larger fish lie further out, so the extra time taken to reel in will benefit your overall weight of fish when the end of the contest arrives.

All anglers are given a time limit of five minutes to catch as many fish as possible. When the time is up the fish caught by each angler will be weighed and a table displayed showing the order of anglers, along with their final weight of fish caught.

Your result is repeatedly flashed on and off to highlight your position. If two anglers gain exactly the same weight, the one with the lowest number of fish comes first in the table.

PROCEDURES

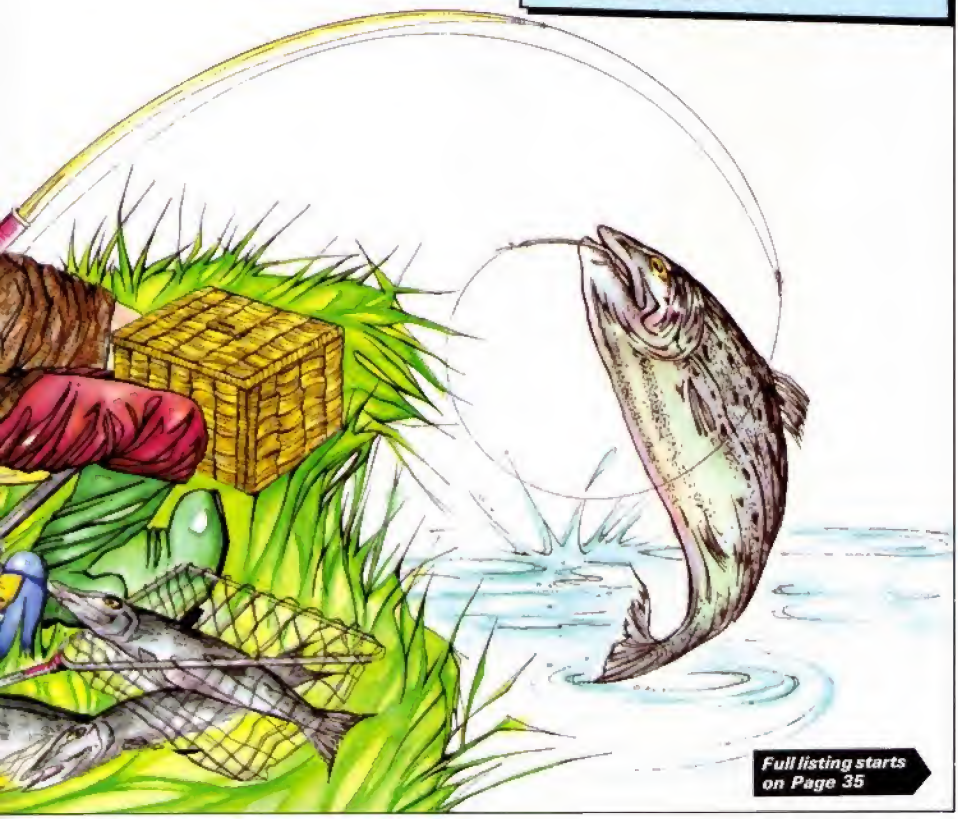
graphics	Creates user defined characters.
title_page	Draws title page and inputs player's name.
initialise	Defines variables and weather conditions.
input_data	Inputs the tackle you require.
penalty	Calculates penalties for using wrong bait.
river	Draws river scenario.
catch_fish	Allows you to fish for exactly five minutes.
times_up	Tells you to stop fishing.
weigh_in	Prints the results and awards prizes to winner.

VARIABLES

name$(1-7)	Stores angler's names.
weight%(1-7)	Stores angler's weights.
fishcaught%	Number of fish caught.
fw%	Weight of last fish caught.
xpos%	X coordinate of angler.
ypos1%	Y coordinate of float 1.
ypos2%	Y coordinate of float 2.
cast%	0 if you haven't cast out, 1 if short cast, 2 if long cast.
weather%	Random number to pick type of weather.
weather$	One of three weather conditions.
depth%	Random depth of river.
penalty%	Number of penalties against you for using wrong tackle.
bait%	Bait used.
hooksize%	Size of hook used.
hookdepth%	Depth of hook.
ounces%	Ounces of shot used.
flow%	Random number to pick speed of river.
fish%	1 if fish is taking bait, 0 if not.
float%	Number of times float bobs up and down.
strike%	Length of time given for player to strike.
X%	X coordinate of end of line.
Y%	Y coordinate of end of line.
winner$	Name of winner.

CONTROLS

A – Short cast.
Z – Long cast.
Space – Strike, or recast line if no fish hooked.
: – Reel in line when fish is hooked.



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From Page 33

```
   10 REM FISHING
   20 REM By Michael Kelsal
l
   30 REM (c) Electron User
   40 REM
   50 IF PAGE=&E00 THEN GOT
O 90
   60 *KEY0 "MO.6:*FX3,2|M*
TAPE|MFOR X%=PAGE TO TOP ST
EP 4:!(&E00+(X%-PAGE))=!X%:
NEXT:PAGE=&E00|MOLD|MRUN|M"
   70 *FX138,0,128
   80 END
   90 *FX3,0
  100 MODE1
  110 DIMname$(7),weight%(7
)
  120 PROCgraphics
  130 PROCtitle_page
  140 PROCinitialise
  150 PROCinput_data
  160 PROCpenalty
  170 VDU23;8202;0;0;0;
  180 PROCriver
  190 PROCcatch_fish
  200 PROCtimes_up
  210 MODE1
  220 VDU23;8202;0;0;0;
  230 PROCweigh_in
  240 RUN
  250 DEFPROCgraphics
  260 VDU23,224,4,4,66,66,3
4,33,33,33,23,225,8,8,28,28
,17,17,34,34,23,226,33,145,
149,149,85,88,66,2,23,227,3
4,40,68,68,84,80,16,16,23,2
28,8,8,8,28,28,8,8,8,23,229
,8,8,8,8,28,8,8,8
  270 VDU23,238,248,248,232
,168,136,254,14,7,23,231,8,
8,8,8,8,8,3,23,232,3,3,4,
11,14,51,196,8,23,233,15,55
,207,62,252,212,68,206,23,2
34,12,48,192,8,8,8,8,8
  280 VDU23,235,17,34,58,59
,59,123,247,15,23,236,26,58
,116,212,204,202,145,16,23,
237,8,8,8,8,8,8,8,126,129,23,
238,8,8,1,1,8,8,1,1,131,23,23
9,99,27,6,7,7,3,4,8
  290 VDU23,240,7,7,127,254
,228,92,68,206,23,241,0,0,1
,0,0,1,1,3,23,242,0,0,0,3,1
2,48,192,0,23,243,28,54,126
,126,60,24,60,126,23,244,28
,54,62,28,8,62,8,8
  300 *KEY1|MO.|MRUN|M
  310 ENDPROC
  320 DEFPROCtitle_page:CLS
  330 VDU19,1,2;0;19,2,4;0;
  340 VDU28,5,15,34,11:COLO
UR129:CLS
  350 VDU28,5,23,34,16:COLO
UR130:CLS
  360 VDU26:COLOUR0:COLOUR1
29
  370 PRINTTAB(24,13);:VDU2
41,230
  380 PRINTTAB(23,14);:VDU2
31,232,233
  390 PRINTTAB(22,15);:VDU2
42,234,235,236
  400 COLOUR2:PRINTTAB(20,1
4);:VDU224,225,8,8,10,226,2
27
  410 COLOUR1:COLOUR130:PRI
NTTAB(16,16);:VDU224,225,8,
8,10,226,227
  420 PRINTTAB(29,16);:VDU2
24,225,8,8,10,226,227
```

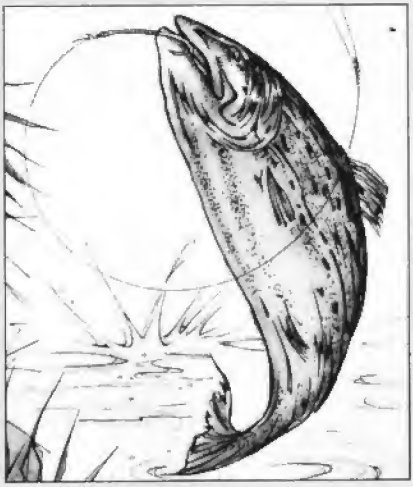
```
  430 COLOUR3:PRINTTAB(13,2
2);:VDU228
  440 COLOUR128:COLOUR3
  450 GCOL0,3:MOVE700,512:D
RAW454,316
  460 PRINTTAB(12,2);"UNITE
D KINGDOM";TAB(11,3);"FISHI
NG CONTEST."
  470 PRINTTAB(12,6);"SPONS
ORED BY:-";TAB(11,8);"MK RE
SEARCH Ltd."
  480 PRINTTAB(2,30);"Progr
am written by Michael Kelsa
l."
  490 PRINTTAB(9,25);"PLEAS
E TYPE YOUR NAME";TAB(9,26)
;"(Upto 15 Characters):"
  500 INPUTTAB(11,28)name$
(1):IFLEN(name$(1))>15 CLS:
GOTO138
  510 ENDPROC
  520 DEFPROCinitialise:*FX
4,1
  530 fishcaught%=0:fw%=0:x
pos%=RND(26)+10:ypos%=16:y
pos2%=30:cast%=0:e%=0:flag%
=0:weather%=RND(3):depth%=R
ND(20)+10:penalty%=RND(10)
  540 FORloop%=2TO7:READn$:
name$(loop%)=n$:weight%(loo
p%)=RND(65):NEXTloop%
  550 DATAMichael Kelsall,R
obert Kelsall,Shaun Wilson,
Nigel Saunders,David Sturge
ss,Gary Gregory
  560 IFweather%=1 weather$
="Sunny.":recbait%=7:rechoo
k%=15:rechookdepth%=depth%-
1
  570 IFweather%=2 weather$
="Cloudy.":recbait%=3:recho
ok%=17:rechookdepth%=depth%
-2
  580 IFweather%=3 weather$
="Raining.":recbait%=2:rech
ook%=14:rechookdepth%=depth
%-3
  590 flow%=RND(3)
  600 IFflow%=1 flow$="'Fas
t'.":recounces%=4
  610 IFflow%=2 flow$="'Ste
ady'.":recounces%=3
  620 IFflow%=3 flow$="'Slo
w'.":recounces%=2
  630 ENDPROC
  640 DEFPROCinput_data:CLS
  650 PRINTTAB(15,0);"Fishi
ng Log."
  660 PRINTTAB(6,2);"Weathe
r:- "+weather$
  670 INPUTTAB(2,4);"What h
ook size (10-23)";hooksize%
:IFhooksize%<10ORhooksize%>
25 GOTO670
  680 PRINTTAB(2,6);"Which
bait:-";TAB(15,7);"1..Lunch
eon Meat";TAB(15,8);"2..Che
ese"
  690 PRINTTAB(15,9);"3..Ea
rthworms";TAB(15,10);"4..Br
ead";TAB(9,12);"Maggots:-"
  700 PRINTTAB(15,14);"5..B
ronze";TAB(15,15);"6..White
";TAB(15,16);"7..Mixed";TAB
(15,17);"8..Casters"
  710 PRINTTAB(10,19);"Pres
s 1-8 for bait"
  720 bait%=GET:IFbait%<49O
Rbait%>56THEN720
  730 PRINTTAB(2,22);"The w
ater has a depth of ";depth
%;" metres."
  740 INPUTTAB(2,23);"What
depth are you fishing at";h
ookdepth%:IFhookdepth%>dept
h%-.5ORhookdepth%<.5 GOTO74
0
  750 PRINTTAB(2,26);"The w
ater is flowing; ";flow$
  760 INPUTTAB(2,28);"How m
any ounces of lead-free sho
t are you going to use (1-1
0)";ounces%:IFounces%<10Rou
nces%>10 GOTO760
  770 ENDPROC
  780 DEFPROCpenalty
  790 IFhooksize%<>rechook%
 penalty%=penalty%+2
  800 IFbait%-48<>recbait%
penalty%=penalty%+2
  810 IFhookdepth%<>rechook
depth% penalty%=penalty%+2
  820 IFounces%<>recounces%
 penalty%=penalty%*2
  830 ENDPROC
  840 DEFPROCriver:CLS
  850 VDU19,0,4;0;19,1,2;0;
19,2,0;0;
  860 VDU28,0,10,39,0:COLOU
R129:CLS:VDU26
  870 VDU28,0,5,39,0:COLOUR
130:CLS:VDU26
  880 COLOUR129:COLOUR0:PRI
NTTAB(17,10);:VDU224,225,32
,32,32,32,224,225,224,225
  890 COLOUR128:COLOUR1:PRI
```

→

Fishing listing

From Page 35

```
NTTAB(17,11);:VDU226,227,32
,32,32,32,226,227,226,227
  900 PRINTTAB(4,12);:VDU22
4,225,10,8,8,226,227,32,224
,225,10,8,8,226,227,32,32,3
2,32,32,32,224,225,10,8,8,2
26,227
  910 PRINTTAB(31,11);:VDU2
24,225,10,8,8,226,227,32,32
,32,32,224,225,10,8,8,226,2
27
  920 COLOUR130:COLOUR3
  930 PRINTTAB(4,0);"United
 Kingdom Fishing Contest.";
TAB(1,2);"Peg no.: 1 - ";sna
me$(1);TAB(1,3)"Number of f
ish caught:";TAB(1,4);"Weig
ht of last fish (lb):"
  940 PRINTTAB(32,2);"Total
";TAB(32,3);"weight:";TAB(2
4,3);"0";TAB(27,4);"0";TAB(
33,4);"0lb"
  950 ENDPROC
  960 DEFPROCcatch_fish
  970 COLOUR129:COLOUR2:TIM
E=0
  980 COLOUR128
  990 PRINTTAB(xpos%-7,ypos
%);" ";PRINTTAB(xpos%-7,yp
os%);" "
 1000 COLOUR2:COLOUR129
 1010 IFcast%=0 PRINTTAB(xp
os%-1,9);" "
 1020 IFa%=1 AND flag%=1 MO
VE(xpos%-1)*32,700:GCOL4,0:
DRAW(xpos%-6)*32,505
 1030 IFa%=1 AND flag%=2 MO
VE(xpos%-1)*32,700:GCOL4,0:
DRAW(xpos%-6)*32,75
 1040 a%=0
 1050 IFcast%=1 OR cast%=2
GOTO1100
 1060 PRINTTAB(xpos%,7);:VD
U237,238,239
 1070 PRINTTAB(xpos%,8);:VD
U32,239,240
 1080 PRINTTAB(xpos%,9);:VD
U32,235,236
 1090 REPEAT
 1100 IFTIME>=30000 GOTO181
0
 1110 A$=INKEY$(5)
 1120 IFA$="A" PRINTTAB(xpo
s%-1,7);:VDU32,32,241,230:P
RINTTAB(xpos%-1,8);:VDU32,2
31,232,233:PRINTTAB(xpos%-1
,9);:VDU242,234,235,236:COL
OUR3:COLOUR128:PRINTTAB(xpo
s%-7,ypos%);:VDU228:cast%=
1:COLOUR129:COLOUR2
 1130 IFA$="Z" PRINTTAB(xpo
s%-1,7);:VDU32,32,241,230:P
RINTTAB(xpos%-1,8);:VDU32,2
31,232,233:PRINTTAB(xpos%-1
,9);:VDU242,234,235,236:COL
OUR128:COLOUR3:PRINTTAB(xpo
s%-7,ypos%);:VDU228:cast%=
2:COLOUR129:COLOUR2
 1140 UNTILcast%<>0
 1150 MOVE(xpos%-1)*32,700
 1160 IFcast%=1 GCOL4,0:DRA
W(xpos%-6)*32,505
 1170 IFcast%=2 GCOL4,0:DRA
W(xpos%-6)*32,75
 1180 fish%=RND(200)-RND(pe
nalty%)
 1190 A$=INKEY$(0):IFA$=" "
flag%=cast%:a%=1:cast%=0:G
OTO980
 1200 IFTIME>=30000 GOTO181
0
 1210 IF fish%()1 GOTO1180
 1220 COLOUR128:COLOUR3
 1230 float%=RND(6):REPEAT
 1240 IFTIME>=30000 GOTO181
0
 1250 IFcast%=1 PRINTTAB(xp
os%-7,ypos1%);:VDU228
 1260 IFcast%=2 PRINTTAB(xp
os%-7,ypos2%);:VDU228
 1270 n%=TIME:REPEATUNTILTI
ME>n%+100
 1280 A$=INKEY$(0):IFA$=" "
flag1=cast%:a%=1:cast%=0:G
OTO980
 1290 IFcast%=1 PRINTTAB(xp
os%-7,ypos1%);:VDU229
 1300 IFcast%=2 PRINTTAB(xp
os%-7,ypos2%);:VDU229
 1310 n%=TIME:REPEATUNTILTI
ME>n%+100
 1320 A$=INKEY$(0):IFA$=" "
flag1=cast%:a%=1:cast%=0:G
OTO980
 1330 float%=float%-1:UNTIL
float%<=0
 1340 COLOUR128:PRINTTAB(xp
os%-7,ypos1%);:VDU32:PRINTT
AB(xpos%-7,ypos2%);:VDU32
 1350 strike%=RND(55)+5:REP
EAT
 1360 IFTIME>=30000 GOTO181
0
 1370 A$=INKEY$(0)
 1380 IFA$=" " AND cast%=1
MOVE(xpos%-1)*32,700:BCOL4,
```



```
0:DRAW(xpos%-6)*32,505
 1390 IFA$=" " AND cast%=2
MOVE(xpos%-1)*32,700:GCOL4,
0:DRAW(xpos%-6)*32,75
 1400 COLOUR2:COLOUR129
 1410 IFA$=" " PRINTTAB(xpo
s%,7);:VDU237,238,239:PRINT
TAB(xpos%,8);:VDU32,239,240
:PRINTTAB(xpos%-1,9);:VDU32
,235,236:flag%=cast%:cas
t%=0:loop%=0:GOTO1480
 1420 strike%=strike%-1:UNT
ILstrike%<2
 1430 COLOUR3:COLOUR128
 1440 IFcast%=1 PRINTTAB(xp
os%-7,ypos1%);:VDU228
 1450 IFcast%=2 PRINTTAB(xp
os%-7,ypos2%);:VDU228
 1460 IFTIME>=30000 GOTO181
8
 1470 GOTO1800
 1480 fX%12,255
 1490 IFflag1=1 Y%=505:fw%=
RND(4)+1
 1500 IFflag%=2 Y%=75:fw%=R
ND(8)+3
 1510 IFRND(1)<.005 fw%=48
 1520 X%=(xpos%-6)*32
 1530 GCOL4,0:MOVExpos%*32,
767:DRAWX%,Y%
 1540 REPEAT
 1550 IFTIME>=30000 GOTO181
8
 1560 A$=INKEY$(0)
 1570 fX%5,1
 1580 GCOL4,0:MOVExpos%*32,
767:DRAWX%,Y%
 1590 X%=X%+RND(50):X%=X%-R
ND(50):Y%=Y%-fw%*2
 1600 IFfw%(40 GOTO1630
 1610 IFhooksize%)13 GOTO16
80
 1620 IFhooksize%(13ANDA$="
:"THENY%=Y%+RND(27)+15:SOUN
D3,-15,5,1
 1630 IFA$=";" Y%=Y%+RND(4)
+11:SOUND3,-15,5,1
 1640 GCOL4,0:MOVExpos%*32,
767:DRAWX%,Y%
 1650 IFY%(50RX%(50RX%)1270
GOTO1680
 1660 UNTILY%)=660
 1670 GCOL4,0:MOVExpos%*32,
767:DRAWX%,Y%:GOTO1700
 1680 GCOL4,0:MOVExpos%*32,
767:DRAWX%,Y%
 1690 SOUND0,-15,5,2:GOTO18
30
 1700 COLOUR0
 1710 IFfw%(6 PRINTTAB(xpos
%-1,8);:VDU244
 1720 IFfw%)=6 PRINTTAB(xpo
s%-1,8);:VDU243
 1730 COLOUR3:COLOUR130
 1740 fishcaught%=fishcaugh
t%+1:PRINTTAB(24,3);fishcau
ght%
 1750 PRINTTAB(27,4);fw%;"
```

```
*
 1760 weight%(1)=weight%(1)
+fw%
 1770 PRINTTAB(33,4);weight
%(1);"lb"
 1780 COLOUR2:COLOUR128
 1790 IFTIME>=30000 GOTO181
0
 1800 GOTO1800
 1810 float%=0:strike%=0:lo
op%=0:ENDPROC
 1820 DEFPROCtimes_up
 1830 LOCALY%,loop%
 1840 COLOUR3
 1850 VDU28,0,31,39,25:COLO
UR128:CLS
 1860 VDU28,0,27,39,25
 1870 COLOUR3
 1880 PRINTTAB(12,2);" STOP
FISHING! "
 1890 FORloop%=1TO30:SOUND3
,-15,2,1:NEXTloop%
 1900 PRINTTAB(12,2);"  TIM
E'S UP!  "
 1910 FORloop%=1TO30:SOUND3
,-15,3,1:NEXTloop%
 1920 FORloop%=1TO30:SOUND3
,-15,4,1:NEXTloop%
 1930 COLOUR128
 1940 VDU26:COLOUR130:FORlo
op%=1TO1500:NEXTloop%
 1950 SOUND3,-15,50,5:SOUND
3,-15,60,5
 1960 FORY%=0TO33:PRINT:PRI
NT:NEXTY%
 1970 ENDPROC
 1980 DEFPROCweigh_in:CLS
 1990 VDU19,1,8;0;
 2000 LOCALloop%,I%
 2010 COLOUR2
 2020 PRINTTAB(4,1);"UNITED
 KINGDOM FISHING CONTEST";T
AB(5,2);"SPONSORED BY MK RE
SEARCH Ltd."
 2030 COLOUR3
 2040 PRINTTAB(1,4);"Positi
on";TAB(11);"Name";TAB(27);
"Weight (lb)"
 2050 MOVE16,900:DRAW16,584
 2060 MOVE336,900:DRAW336,5
84
 2070 MOVE864,900:DRAW864,5
84
 2080 MOVE1264,900:DRAW1264
,584
 2090 MOVE16,900:DRAW1264,9
00
 2100 MOVE16,852:DRAW1264,8
52
 2110 MOVE16,584:DRAW1264,5
84
 2120 pX=1
 2130 FORloop%=80TO85STEP-1
 2140 FOR1%=1TO7
 2150 IFweight%(1)=loop%AND
1%=1 COLOUR1ELSECOLOUR3
 2160 IFweight%(1%)=loop% P
RINTTAB(5,pX+5);pX;TAB(11,p
X+5);name$(1%);TAB(31,pX+5)
;weight%(1%):pX=pX+1:IFpX=1
=1 winner$=name$(1%)
 2170 NEXT1%
 2180 NEXTloop%
 2190 COLOUR3
 2200 PRINTTAB(2,15);"The w
inner, ";winner$;", will";T
AB(1,16);"receive:";TAB(3,1
8);"Ten years supply of sag
gots of their    choice.";T
AB(3,21);"The MK solid Gold
 Trophy;"
 2210 COLOUR130
 2220 PRINTTAB(9,23);"UNITE
D KINGDOM ANGLER";TAB(9,24)
;"    OF THE YEAR.      ";TA
B(9,25);"
   ";TAB(9,26);"    PRESENT
ED TO:    ";TAB(9,27);SPC(2
1);TAB(8,28);SPC(23);TAB(12
,27);winner$
 2230 COLOUR128
 2240 PRINTTAB(10,30);"Pres
s a key to fish."
 2250 *FX15,1
 2260 A=GET:ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

Extend your vocabulary to something more than a one letter word

By ROBIN NIXON

LAST month we looked at how to intercept the Electron's Basic error handling routine to check for the new keyword B, for BEEP.

In this article we will be taking this process one step further by adding more than one new keyword and allowing them to be as many characters long as we like.

To recap, in getting the Electron to recognise B as a keyword we intercepted the Break (BRK) vector, stored at locations &202 and &203 and checked all errors coming through for Mistake.

If an error was Mistake we then checked to see whether or not it was caused by our new keyword.

If you look at Program I, *ABC* for Added Basic Commands you will see that up to just before *comploop* it is virtually identical to the program *BEEP* from my last article.

The differences begin at line 1070 where we store the location of the start of a table that contains our new keywords, shown in Table I.

Before we go any further let's have a quick look at this table (lines 1660-1900). The table follows the format:

New keyword
Zero byte
Action address
New keyword
Zero byte
Action address
. . .
. . .
Table-end marker

The new keywords are followed by a zero byte so that we can recognise the end of each keyword while checking for a match.

The action addresses point to where the keyword's corresponding routine commences.

If the table-end marker is reached while checking it naturally notifies *ABC* that the Mistake error was not caused by one of our new keywords.

Character 58 has been used as the table-end marker because it is a colon and, being a statement separator, can not be used as part of a variable or keyword.

Right, back to *comploop*. Line 1140 sets register Y to zero. This will be used as our offset into words in the keyword table that are being checked.

Then lines 1180 to 1250 check through a keyword until a match has been found. If zero is encountered we have a match so line 1190 branches to *found*.

Line 1200 checks whether we've tested all the keywords and, if so, line 1210 branches to *notcommand* which exits to Basic's own error handler.

Otherwise, lines 1290 to 1340 call *incmatch* (lines 1530-1620) which increments our pointer into the keyword table to point to the start of the next keyword, and then jump back into *comploop* to continue checking for a match.

If we've reached line 1380 we must have found a match and the Mistake was caused by one of our new keywords, so we store the contents of register Y, which now contains the length of the keyword, in *offset*.

You will see later how this is used to increment the Basic interpreter's pointer into the program.

Then line 1390 increments Y to point to the low byte of the keyword's action address and lines 1400 and 1410 store it in *acadd1*. Likewise, lines 1420 to 1440 store the high byte in *acadd2*.

Now for a bit of devious programming. As you may know, when a JSR – jump to subroutine – is encountered, the location of the next instruction following the JSR is pushed on to the 6502 stack so that the processor knows where to continue execution once the subroutine has been completed.

If we push our own return address on to the stack and simply JMP (jump) to a subroutine, the processor will resume execution at the address it finds on the stack.

This is exactly what lines 1450 to 1490 do. They load the low and high byte of *quit–1* and push them on the stack.

The –1 is there because, after an RTS, the 6502 increments the program counter to point to the next instruction.

This means that once a

BEEP	Causes a beep as with VDU 7.
SWAP A%,B%	Swaps the values of two integer variables. *A%* and *B%* can be any two integer variables.
ZEROINT	Clears the values of all integer variables to zero.
INVERSE	Inverses the foreground and background text colours.
NORMAL	Sets the foreground and background text colours to normal.
FRAME	Waits for the electron beam to fly back to the start before updating the screen and is useful for preventing flickering during animation.
SCRON	Turns on output to the screen.
SCROFF	Turns off output to the screen.

Table I: The extra keywords provided by ABC

keyword subroutine has been executed the RTS at the end will force the processor to jump to *quit*, which will then tidily leave *ABC*.

Having pushed this address on the stack, line 1490 jumps to the location stored in *acadd1* and *acadd2* which is where we stored the action address of the keyword.

Before examining the coding of the new keywords let's just have a look at *quit* (line 3270).

Lines 3270 to 3310 take the contents of *offset* – the length of the keyword – and update the program pointer PTRA to the byte following the keyword.

This is so that when we return execution to the Basic interpreter it does not encounter our keyword again.

And, as in *BEEP*, line 3320 moves PTRA to the next statement separator or program line, lines 3330 to 3400 pull unwanted error handling information from the stack and line 3410 passes control back to the interpreter.

We are now ready to look at the new keyword routines.

Lines 1940 to 1960 are the familiar *BEEP*.

Lines 1980 to 2640 swap the values of two integer variables. Lines 2000 to 2080 strip any spaces between *SWAP* and the first variable.

Lines 2120 to 2160 get the first variable name and put it in *vname1*, then lines 2170-2250 put the second variable name in *vname2*.

After that lines 2260 to 2430 call *swap1* (lines 2480-2640) which swaps the contents of the two variables held in page 4.

Line 2440 RTS returns using the address we pushed on to the stack.

zeroloop, lines 2730 to 2770, simply sets the values of all integer variables to zero.

inverse and *normal*, lines 2810 to 3010, inverse the text foreground and background colours using VDU 17.

Lines 3050 to 3070 do a *FX 19 which causes any updating of the screen to wait until the electron beam flies back to the top left hand side of the screen.

This helps to eliminate flicker during animation but does slow programs down.

Finally *scron* and *scroff* turn screen output on and off by doing either:

```
*FX 3,2
```

for screen off, or:

```
*FX 3,0
```

for screen on.

Phew, that's quite a bit of code, but we got there in the end.

When you've finished typing in Program I, I suggest you save it as *ABC–SOURCE* (the SOURCE being for source file) before running it. When run it will automatically save the assembled object code as *ABC*.

As the code assembles at &B00 you won't be able to use the function keys or user defined characters.

If you do need to use them I suggest you assemble the code elsewhere by altering line 420.

Also, if you have a Plus 3, don't forget to type:

```
*MOUNT
```

before you run the program.

● *Next month we'll look at how to add the loop structure WHILE . . . WEND to our set of extra keywords.*

```
100 REM ******************
110 REM *                *
120 REM *      ABC       *
130 REM *                *
140 REM *  Added Basic   *
150 REM *   Commands     *
160 REM *                *
170 REM *  By  Robin     *
180 REM *      Nixon     *
190 REM *                *
200 REM *  (c)  Electron *
210 REM *       User     *
220 REM *                *
230 REM ******************
240 REM
250 MODE 6
260 oswrch=&FFEE
270 osbyte=&FFF4
280 checkend=&9857
290 continue=&B89B
300 newbrk1=&70
310 newbrk2=&71
320 vname1=&72
330 vname2=&73
340 ptra1=&B0
350 ptra2=&B1
360 keytab1=&B2
370 keytab2=&B3
380 acadd1=&B4
390 acadd2=&B5
400 offset=&B6
410 FOR PASS=0 TO 3 STEP3
420 P%=&B00
430 [
440 OPT PASS
450 \
460  .start
470 \
480 LDA &202
490 LDX &203
500 CMP #main MOD &100
510 BNE changebrkvector
520 CPX #main DIV &100
530 BEQ alreadychanged
540 \
550 .changebrkvector
560 \
570 STA newbrk1
580 STX newbrk2
590 LDA #main MOD &100
600 STA &202
610 LDA #main DIV &100
620 STA &203
630 \
640 .alreadychanged
650 \
660 RTS
670 \
680 .main
690 \
700 PHP
710 PHA
720 TYA
730 PHA
740 TXA
750 PHA
760 LDY #0
770 LDA (&FD),Y
780 CMP #4
790 BEQ checkcommand
800 \
810 .notcommand
820 \
830 PLA
840 TAX
850 PLA
860 TAY
870 PLA
880 PLP
890 JMP (newbrk1)
900 \
910 .checkcommand
920 \
930 LDA &A
940 CLC
950 ADC &B
960 STA ptra1
970 LDA &C
980 ADC #0
990 STA ptra2
1000 SEC
1010 LDA ptra1
1020 SBC #1
1030 STA ptra1
1040 LDA ptra2
1050 SBC #0
1060 STA ptra2
1070 LDA #keytable MOD&100
1080 STA keytab1
1090 LDA #keytable DIV&100
1100 STA keytab2
1110 \
1120 .comploop
1130 \
1140 LDY #0
1150 \
1160 .comploop1
1170 \
1180 LDA (keytab1),Y
1190 BEQ found
1200 CMP #50
1210 BEQ notcommand
1220 CMP (ptra1),Y
1230 BNE next
```

→

From Page 39

```
1240 INY
1250 JMP comploop1
1260 \
1270 .next
1280 \
1290 JSR incmatch
1300 BNE next
1310 JSR incmatch
1320 JSR incmatch
1330 JSR incmatch
1340 JMP comploop
1350 \
1360 .found
1370 \
1380 STY offset
1390 INY
1400 LDA (keytab1),Y
1410 STA acadd1
1420 INY
1430 LDA (keytab1),Y
1440 STA acadd2
1450 LDA #(quit-1) DIV&100
1460 PHA
1470 LDA #(quit-1) MOD&100
1480 PHA
1490 JMP (acadd1)
1500 \
1510 .incmatch
1520 \
1530 LDA keytab1
1540 CLC
1550 ADC #1
1560 STA keytab1
1570 LDA keytab2
1580 ADC #0
1590 STA keytab2
1600 LDY #0
1610 LDA (keytab1),Y
1620 RTS
1630 \
1640 .keytable
1650 \
1660 EQUS "BEEP"
1670 EQUB 0
1680 EQUW beep
1690 EQUS "SWAP"
1700 EQUB 0
1710 EQUW swap
1720 EQUS "ZEROINT"
1730 EQUB 0
1740 EQUW zeroint
1750 EQUS "INVERSE"
1760 EQUB 0
1770 EQUW inverse
1780 EQUS "NORMAL"
1790 EQUB 0
1800 EQUW normal
1810 EQUS "FRAME"
1820 EQUB 0
1830 EQUW frame
1840 EQUS "SCRON"
1850 EQUB 0
1860 EQUW scron
1870 EQUS "SCROFF"
1880 EQUB 0
1890 EQUW scroff
1900 EQUD 50
1910 \
1920 .beep
1930 \
1940 LDA #7
1950 JSR oswrch
1960 RTS
1970 \
1980 .swap
1990 \
2000 LDY offset
2010 \
2020 .swap0
2030 \
2040 LDA (ptra1),Y
2050 CMP #32
2060 BNE first
2070 INY
2080 JMP swap0
2090 \
2100 .first
2110 \
2120 SEC
2130 SBC #64
2140 ASL A
2150 ASL A
2160 STA vnaae1
2170 INY
2180 INY
2190 INY
2200 LDA (ptra1),Y
2210 SEC
2220 SBC #64
2230 ASL A
2240 ASL A
2250 STA vnaae2
2260 INY
2270 INY
2280 STY offset
2290 LDA vnaae1
2300 STA swap2+1
2310 LDA #&74
2320 STA swap3+1
2330 JSR swap1
2340 LDA vnaae2
2350 STA swap2+1
2360 LDA vnaae1
2370 STA swap3+1
2380 JSR swap1
2390 LDA #&74
2400 STA swap2+1
2410 LDA vnaae2
2420 STA swap3+1
2430 JSR swap1
2440 RTS
2450 \
2460 .swap1
2470 \
2480 LDY #0
2490 \
2500 .swap2
2510 \
2520 LDA &4000,Y
2530 \
2540 .swap3
2550 \
2560 STA &4000,Y
2570 CPY #3
2580 BEQ swapdone
2590 INY
2600 JMP swap2
2610 \
2620 .swapdone
2630 \
2640 RTS
2650 \
2660 .zeroint
2670 \
2680 LDA #0
2690 LDY #4
2700 \
2710 .zeroloop
2720 \
2730 STA &4000,Y
2740 INY
2750 CPY #&6C
2760 BNE zeroloop
2770 RTS
2780 \
2790 .inverse
2800 \
2810 LDA #17
2820 JSR oswrch
2830 LDA #0
2840 JSR oswrch
2850 LDA #17
2860 JSR oswrch
2870 LDA #135
2880 JSR oswrch
2890 RTS
2900 \
2910 .normal
2920 \
2930 LDA #17
2940 JSR oswrch
2950 LDA #7
2960 JSR oswrch
2970 LDA #17
2980 JSR oswrch
2990 LDA #128
3000 JSR oswrch
3010 RTS
3020 \
3030 .frame
3040 \
3050 LDA #19
3060 JSR osbyte
3070 RTS
3080 \
3090 .scron
3100 \
3110 LDA #3
3120 LDX #0
3130 LDY #0
3140 JSR osbyte
3150 RTS
3160 \
3170 .scroff
3180 \
3190 LDA #3
3200 LDX #2
3210 LDY #0
3220 JSR osbyte
3230 RTS
3240 \
3250 .quit
3260 \
3270 DEC offset
3280 LDA offset
3290 CLC
3300 ADC &A
3310 STA &A
3320 JSR checkend
3330 PLA
3340 PLA
3350 PLA
3360 PLA
3370 PLA
3380 PLA
3390 PLA
3400 PLA
3410 JMP continue
3420 ]
3430 NEXT
3440 OSCLI ("*SAVE ADC "+S
TR$~start+" "+STR$~P%)
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

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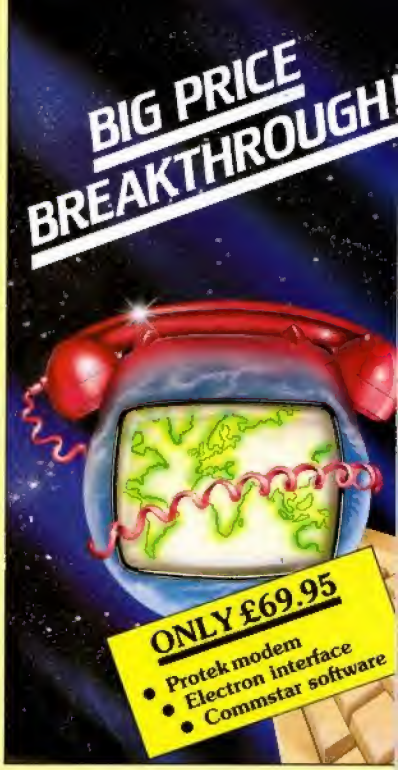

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YOU MUST KNOW WHERE TO DRAW THE LINE..

Part Four of the Electron graphics series by TREVOR ROBERTS

IF you've followed this series so far your screen should now be aglow with all sorts of coloured messages. You'll have a mastery of the COLOUR command and be a virtual virtuoso of VDU 19.

This month will see us travelling further into the realms of graphics as we leave text behind and learn where to draw the line.

Unsurprisingly, to get the Electron to draw a line you have to tell it that you want a line drawing. You use the aptly named DRAW command, but that's not all there is to it.

If someone told you to draw a line, your first response would be "Where?" Just like you the micro needs more information, and this is supplied in the form of two numbers following DRAW, so:

```
DRAW 1000,1000
```

gives the micro the data it needs.

Now when we want to put text in various screen positions we use TAB followed by a couple of numbers. These are coordinates measured in lines and character spaces from the top left corner of the screen indicating where the text is to appear.

Are these the numbers that follow the DRAW command? The answer is no.

Annoyingly, although the DRAW command does use a system of coordinates to decide exactly where the line is drawn, it uses a completely different set from those used with TAB.

Having said that, the graphics coordinates are quite simple to use when you get the hang of them. Figure I shows how they are measured.

As you can see the graphics coordinates are measured from the bottom left corner of the screen which has the value 0,0. The horizontal scale or X axis is divided into 1280 divisions, numbered from 0 to 1279.

Similarly the vertical scale or Y axis consists of 1024 parts numbered from 0 to 1023. Using these two axes you can – theoretically, at any rate – pinpoint any of 1024*1280 points on the graphics screen in the form of X coordinate, Y coordinate.

It's these coordinates that we use with DRAW and unlike the text coordinates we use with TAB, regardless of which mode we are in the same graphics coordinates apply.

So with no more ado let's draw a line. Put the Electron into Mode 5 with:

```
MODE 5
```

and then draw a line with:

```
DRAW 640,512
```

This should produce a line going from the bottom left corner to the centre of the screen. To understand how this happens it's necessary to understand the concept of the graphics cursor.

You're already used to the text cursor – the annoying flashing line that shows where the next character is going to appear on screen. There's also a graphics cursor. However the graphics cursor is far more reticent.

In fact it's invisible. But while you may not be able to see it, to the Electron it's there and it uses the position of the graphics cursor to decide how to obey the various graphics commands such as DRAW.

Now what DRAW tells the micro is that it is to draw a straight line between the current position of the graphics cursor and the point specified by the numbers following the DRAW. This is what happened when we drew our line with:

```
DRAW 640,512
```

When we change mode the graphics cursor automatically goes to the origin as 0,0 is known. So when we issued the above command the micro knew that it had to draw a line from the current cursor position 0,0 to the centre of the screen 640,512.

Can you guess what will happen if you now tell the micro to:

```
DRAW 1279,1023
```

The result is that line extends to the top-right corner of the screen. If you like you can think of the graphics cursor as the point of a pen. Before the last DRAW command it was resting at 640,512. Then our:

```
DRAW 1279,1023
```

told it to go to the point 1279,1023. This it does, with the point of the pen sketching a straight line as it does so. If you now enter:

```
DRAW 1279,0
```

followed by:

```
DRAW 0,0
```

you'll see a right angled triangle appear. Play around with DRAW, issuing your own commands such as:

```
DRAW 56,89
```

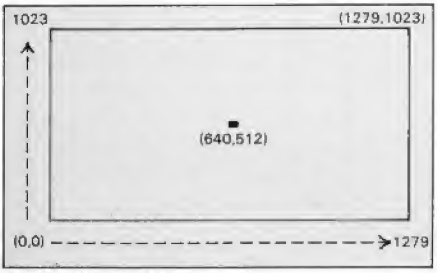

Figure I: Graphics coordinates

> *The graphics cursor is far more reticent – in fact it's invisible*

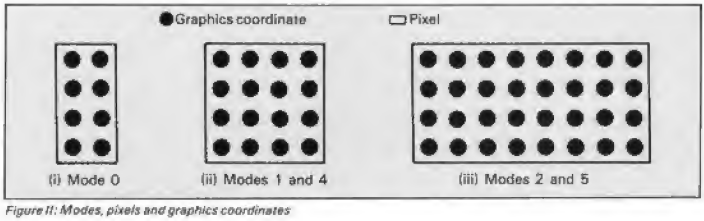

Figure II: Modes, pixels and graphics coordinates

At first stay within the screen coordinate values shown in Figure I. As you get more confident try exploring other values. What happens if you:

```
DRAW 2000,2000
```

or:

```
DRAW -100,-100
```

Try it and see – or rather see only part of the line that can appear on the display.

Now as you travel round the screen you'll probably notice one drawback to DRAW. You're always stuck with going from the last point mentioned in a previous DRAW command.

The only exception is after a mode change when the graphics cursor is waiting at 0,0, but this isn't always what we want.

Going back to the pen point image of the graphics cursor, when we draw on paper we often lift our pen from one part of the paper and move it to another. We don't want the trailing line that we would get from using DRAW, so is there a Basic command that will allow for this?

The answer is yes – the MOVE command. This tells the graphics cursor to move from its current position and go to the coordinates found after MOVE, and no line is to be drawn as it does this. Let's try it out. Put the Electron into Mode 0 with a quick:

```
MODE 0
```

which will return the graphics cursor to 0,0.

```
10 REM Program I
20 MODE 0
30 VDU 23,1,0;0;0;0;
40 FOR line=1 TO 50
50 MOVE 640,512
60 DRAW RND(1279),RND(10
23)
70 NEXT line
80 REPEAT UNTIL FALSE
```

Program I

Suppose we now want a line to be drawn from the centre of the screen to the top left corner. Obviously we need to get the graphics cursor to the centre of the screen and start DRAWing from there. However we can't use a:

```
DRAW 640,512
```

to do this. This does position the graphics cursor in the centre of the screen but it leaves an unwanted line behind it as it goes.

What is needed is a MOVE command. Go back to the beginning with:

```
Mode 0
```

and try:

```
MOVE 640,512
```

and you'll see nothing. Don't despair though, the graphics cursor has moved to the centre of the screen. This is shown by the line that appears when we use:

```
DRAW 0,1023
```

It goes from the last cursor position – 640,512 – to the top left corner – 0,1023.

I'll leave it to you to cover the screen with lines as you explore DRAW and MOVE. Program I shows both commands in use, drawing a simple star shape. Try leaving out line 50 and see what happens.

Line 30 is just there to switch off the text cursor while the last line forms an endless loop, stopping the prompt from appearing and spoiling our masterpiece.

Once you're confident you understand MOVE and DRAW – they're quite simple really – try writing a program to produce a simple picture on the screen, but before that have a look at Program II.

It's a fairly simple program but it does make a couple of important points. The first is that DRAW doesn't work in every mode. As, at the touch of a key, the program loops through the Electron's seven modes you'll see that there are two occasions when no lines appear.

This is when the Micro is in Modes 3 and 6. In fact none of the graphics commands we'll be learning work in these two modes. They're confined solely to text and hence are known as text-only modes.

That still leaves us with five modes in which to use our MOVE and DRAW commands. And in each mode the line is drawn across the screen from bottom left to top right. However you'll notice that the line varies in appearance.

```
10 REM Program II
20 FOR loop=0 TO 6
30 MODE loop
40 PRINT "Mode ";loop
50 DRAW 1279,1023
60 wait=GET
70 NEXT loop
```

Program II

In Mode 0 it's a thin, fine line. In Modes 1 and 4 it's coarser and in Modes 2 and 5 it seems to be built up of little blocks. The resolution of the screen, as this phenomenon is known, varies from mode to mode. So what's this about?

It harks back to our screen coordinates. As the graphics coordinates range from 0 to 1279 and 0 to 1023 there are some 1,310,720 – 1280*1024 – points on the graphics screen.

The trouble is that even if the monitor or TV we use could handle that number of points our poor little Electron can't.

It has only got a limited amount of memory and can only spare so much for the screen. There's no way it could hold information on all these points.

The result is that in any mode there's a trade off between the number of lines and characters on the screen, the number of colours available and the resolution of the screen.

As you explore the modes you'll find that the more colours a mode has, the fewer characters per line and the coarser the resolution of the graphics screen.

Hence all the different modes of the Electron – each →

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one a different compromise between colours, clarity and amount of memory used – and the differing resolutions.

Instead of using the graphics coordinates individually the Electron deals with them in bundles. If one graphics coordinate is referred to by a graphics command the Electron deals with that point and all the other points in that particular bundle as a job lot.

The smaller the bundle the higher the resolution, the bigger the bundle the coarser the resolution. These bundles are known as pixels. In theory you can address all the points defined by the graphics coordinates.

In practice the particular pixel size for a mode is the smallest unit you can deal with. Use a graphics command to refer to one point in a pixel and all the points in that pixel are affected. Figure II shows the relationship between the graphics coordinates and the pixels in each mode.

This grouping of graphics coordinates into discrete bundles or pixels can be quite useful. Take a look at Program III which gradually fills the screen.

Here the FOR ... NEXT loop cycles 1024 times and each time a horizontal line is drawn across the screen from

```
10 REM Program III
20 MODE 5
30 VDU 23,1,0;0;0;0;
40 FOR loop=0 TO 1023
50 MOVE 0,loop
60 DRAW 1279,loop
70 NEXT loop
80 REPEAT UNTIL FALSE
```

Program III

left to right. It may be slow but it works. A look at Figure II gives a hint of a better way as shown in Program IV.

This does exactly the same job as Program III but does it much faster. The secret lies in

```
10 REM Program IV
20 MODE 5
30 VDU 23,1,0;0;0;0;
40 FOR loop=0 TO 1023 ST
EP 4
50 MOVE 0,loop
60 DRAW 1279,loop
70 NEXT loop
80 REPEAT UNTIL FALSE
```

Program IV

line 40 which now has a STEP 4 at its end. From this you'll see that the loop cycles only 256 times as opposed to the previous programs 1024 cycles. Yet the result is the same.

The explanation lies in the pixels. In Mode 5 each pixel contains 32 graphics coordinates – 4 high by 8 across. Now when a line is drawn through any one of the four rows of graphics coordinates in one of these pixels every row in the pixel is turned on.

So it's a waste of time DRAWing a line through the other coordinates contained in that pixel as the job has already been done. Hence Program IV only has to take the Y coordinates in steps of four at a time. The result is the same.

● *And that's where we'll leave it for this time. Try varying the mode and the step in Program IV. Can you get the lines going from top to bottom or left to right? That should keep you busy until next month when we'll be looking at lines again, only a little more colourfully.*

Minibase – a useful way to demonstrate random access filing

By ROLAND WADDILOVE

WE had a brief look at files last month and I introduced random access filing. To demonstrate how powerful this can be I've written a short database which can be used to store a list of names and telephone numbers on disc.

All disc systems for the Electron and BBC Micro are capable of random access filing so the database will run on either micro, provided it is disc-based. BBC Micros will, of course, need Basic II.

If you remember, last month we saw that to create a file we use OPENOUT and that:

```
file=OPENOUT "Data"
```

creates a file called Data. To write information to the file we use PRINT#like:

```
PRINT# file,a,b%,c$
```

This writes a real number *a*, an integer *b%* and a string *c$* to the file. When we've finished we CLOSE the file with:

```
CLOSE# file
```

When we want to read what's in the file we use OPENIN and INPUT # like:

```
file=OPENIN "Data"
INPUT# file,a,b%,c$
```

not forgetting to close it again afterwards.

Note that the data is input in the same order that it was written. If it isn't you'll get an error message.

When information is written to a file what actually happens? Well, first a byte is written to say what type of data follows – &40 indicates an integer, &FF means a real and &00 a string.

Integers are four bytes long, which means that a total of five bytes need to be written to the file – the type byte plus the integer. Reals are six bytes, one for the type and five for the real number.

Since strings can be anything from 0 to 255 characters long an extra byte is needed to say how long it is. So a string consists of one byte for the type, one byte for the length followed by the string itself which, incidentally, is actually stored backwards.

Have a look at this month's example program, Minibase which gives you an electronic telephone directory. I'll go through the six menu options one at a time.

The first creates a new file using OPENOUT. Three strings, each 15 bytes long, are used to store the telephone number, first name and last name.

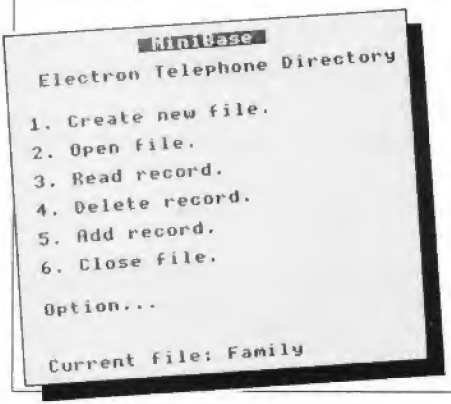
So each record in the file is (15+2) + (15+2) + (15+2) bytes long – 15 bytes for the string, one for the type and one for the length each time. The record length is stored at the start of the file.

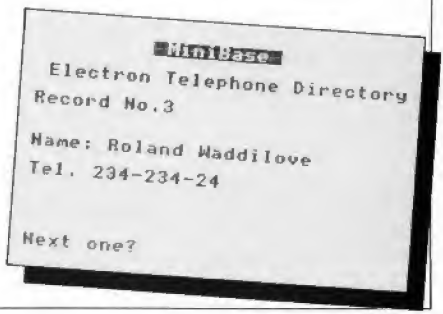
The pointer PTR# is set to the end of the file, the maximum number of records multiplied by the length of each record, and then closed.

The length of a file is initially zero and whenever PTR # is moved past the end of a file its length is increased, so this reserves space on the disc for our database.

Although not essential it's useful, since if there isn't enough space on the disc an error will be reported which can be trapped.

The second option opens a file. Note that OPENUP is used rather than OPENIN. This





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opens a file for both reading and writing. If the channel number stored in *file* is zero then the file doesn't exist and an appropriate error message is given.

The length of each record is read from the start of the file. When a file is opened the function EXT # returns the length of the file. So, EXT# divided by the length of each record gives the maximum number of records, *max*.

A record is read by moving PTR# to the start of the record and inputting the first name, last name and phone number. The first record is at 1 × record, the second 2 × record, the third at 3 × record and so on.

To delete, a record PTR is moved to the start of the record and three null strings are written, "","","".

When a record is added it is always added to the first free space.

This is found by starting with record one and reading *first$* until it's null string, "". The new record is placed here.

The last option closes the file when you've finished with it. If you don't close it any alterations you made may not be written.

Start by creating a file with option one. You can't do anything until you've opened the file, so select option two and open it.

If you read it you'll see that it's empty, so add a few records then close the file. The data is now safe on disc. At a later date you can open it again, add a few more records, delete some, and so on.

How many names and telephone numbers you can fit on a disc naturally depends upon the disc system. There is 320k of space available on a Plus 3 disc and since each record only requires 51 bytes we can store 320,000/51 or 6,274 names and phone numbers, which should be enough to satisfy most people.

Minibase isn't meant to be the definite database for the Electron, it was designed simply to demonstrate random access filing. You can't sort or print records, or even catalogue the disc so it's far from complete.

Having started you off I'll leave it to you to finish it.

● *Next month we'll look at extra commands for your Electron.*

```
  10 REM Minibase
  20 REM By R.A.Waddilove
  30 REM (c) Electron User
  40 ON ERROR CLOSE# 0:REPORT:PRINT" at line ";ERL:END
  50 MODE 6:VDU 19,0,4;0;
  60 name$=""
  70 COLOUR 129:COLOUR 0:PRINT TAB(13,1)" MiniBase "
  80 COLOUR 128:COLOUR 1:PRINT TAB(5,3)"Electron Telephone Directory"
  90 VDU 28,4,24,36,5
 100 REPEAT CLS
 110 PRINT TAB(0,18)"Current file: ";name$;CHR$30
 120 PRINT "1. Create new file."
 130 PRINT"2. Open file."
 140 PRINT"3. Read record."
 150 PRINT"4. Delete record."
 160 PRINT"5. Add record."
 170 PRINT"6. Close file."
 180 PRINT''"Option...";
 190 REPEAT key=GET-48
 200 UNTIL key>0 AND key<7
 210 CLS
 220 IF key>2 AND name$="" THEN RUN
 230 ON key GOSUB 280,400,490,650,790,900
 240 UNTIL FALSE
 250 END
 260
 270 REM Create file
 280 PRINT''"Create new file..."
 290 INPUT''"Name ";name$
 300 file=OPENOUT name$
 310 INPUT''"How many names ";max
 320 record=(15+2)+(15+2)+(15+2)
 330 PRINT# file,record
 340 PTR# file=record*(max+1)
 350 CLOSE# file
 360 name$=""
 370 RETURN
 380
 390 REM Open file
 400 PRINT''"Open file..."
 410 INPUT''"Name ";name$
 420 file=OPENUP name$
 430 IF file=0 PRINT''"No such file!";CHR$7:FOR i=0 TO 5000:NEXT:RETURN
 440 INPUT# file,record
 450 max=(EXT# file DIV record)-1
 460 RETURN
 470
 480 REM Read record
 490 PRINT''"Read record..."
 500 PRINT''"Which (1-";max;") ";
 510 INPUT number
 520 REPEAT CLS
 530 PTR# file=number*record
 540 INPUT# file,first$,last$,phone$
 550 PRINT "Record No.";number
 560 PRINT''"Name: "first$;" "last$''"Tel. ";phone$
 570 PRINT''''"Next one?";
 580 REPEAT key=GET AND &DF
 590 UNTIL key=ASC"N" OR key=ASC"Y"
 600 number=number+1
 610 UNTIL key=ASC"N" OR number>max
 620 RETURN
 630
 640 REM Delete record
 650 PRINT''"Delete record..."
 660 PRINT''"Which (1-";max;") ";
 670 INPUT number
 680 PTR# file=number*record
 690 INPUT# file,first$,last$,phone$
 700 PRINT''"Name: "first$;" "last$''"Tel. ";phone$
 710 PRINT''"Delete...?";
 720 key=GET AND &DF
 730 IF key<>ASC"Y" RETURN
 740 PTR# file=number*record
 750 PRINT# file,"","",""
 760 RETURN
 770
 780 REM Add record
 790 number=0
 800 REPEAT CLS
 810 PRINT''"Add record..."
 820 REPEAT
 830 number=number+1
 840 PTR# file=number*record
 850 INPUT# file,first$
 860 UNTIL first$="" OR number>max
 870 PRINT''"Record No. ";number
 880 PTR# file=number*record
 890 INPUT''"First name ";first$
 900 INPUT''"Last name ";last$
 910 INPUT''"Phone number";phone$
 920 PRINT# file,LEFT$(first$,15),LEFT$(last$,15),LEFT$(phone$,15)
 930 PRINT''"Another one?"
 940 key=GET AND &DF
 950 UNTIL key<>ASC"Y" OR number>max
 960 RETURN
 970
 980 REM Close file
 990 IF name$<>"" PRINT''"Closing "name$:CLOSE# file
1000 name$=""
1010 RETURN
```

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INVASION FORCE Exciting zap 'em space game. **EASTER EGG HUNT** Seasonal game using compass points. **BACH TO BASICS** Music tutor. **NOTICE BOARD** Text scrolling utility. **SEARCH and RECOVER** Two routines from the disc article. **NOTEBOOK** Recursion backwards.

On the March 1986 tape:
GRAND PRIX Exciting race game. **DICER** A clever test of strategy **MARCHING ORDER** Counting and ordering numbers. **FIND AND REPLACE** Useful editing program. **SECTOR EDITOR** Excellent disc utility. **TIMEPIECE** Superb graphics demonstration. **OXO** Game of cunning. **TRICIRC** A circle of triangles.

On the February 1986 tape:
NECROMANCER Superb text adventure. **GREBIT** Arcade action. **FAST BACKUP** Disc utility. **MACHINE CODE** How to write an arcade game. **TAPEDISC** More software transferring techniques. **SIDEWAYS RAM** Example program.

On the January 1986 tape:
FRUIT WORM An arcade classic. **HELICOPTER RESCUE** Pilot an air sea rescue helicopter. **MACHINE CODE** Detect collisions between sprites **TAPEDISC** Transfer your software to disc. **MODE012** Multi-Mode screens.

On the December 1985 tape:
GET SET SANTA Christmas fun collecting presents. **MISSILE ATTACK** Save your cities! **PROGRAM PROBE** Using joysticks. **SPACE COUNT** Counting for youngsters. **CHRISTMAS CARD** Cards and carols for all. **DISC MENU** Disc Menu creator.

On the November 1985 tape:
KARATE WARRIOR Electrifying combat. **ULA** Mode 6 Mode 7! **PAINT ROLLER** Colourful arcade action. **DEFUSE** Beware the bombs. **SPRITE PRINT** Machine code graphics utility. **TRAIN** Far from stationery graphics.

On the October 1985 tape:
DUNGEON QUEST An amazing all action arcade adventure. **PILOT** Computer assisted learning language. **RAVING ROLLER** Arcade action in the garden. **TRAIN** Animated action. **KALEIDOSCOPE** Colourful graphics action.

On the September 1985 tape:
TEXNDAN 3D Wild West shootout. **PINTCURSOR** Machine code graphics. **SPRITE/ED** Sprite editor. **COMPOSE** Writing music simplified. **REVERSI** Cunning strategy game. **SIMPLEFILE** Save and read data. **BOUNCE BALL** Two player action. **ROTATE** Animation in a spin.

On the August 1985 tape:
DIGGA Exciting arcade action beneath the earth. **DODGE THE ASTEROIDS** Fun deep in space among the asteroids. **M/CODE GRAPHICS** Sliding pins of beer! ***FX** The OS explored. **MOVEIT** An intriguing sliding puzzle. **HEXGRAM** An educational game to increase your word power.

On the July 1985 tape:
MANIC MOLE Machine code action at its best. **HIGHER OR LOWER** Guess the card. **TIME BOMB** Carefully collect TNT. **M/CODE GRAPHICS** Two demonstrations. **FX1/2** The OS on call. **PIRATE MATHS** Sum fun. **NOTEBOOK** Password Generator.

On the June 1985 tape:
QUASIMODO Bellringing classic. **DISASSEMBLER** Machine code utility. **ACTIVITIES** Educational fun. **REFLECT** Aggressive aliens. **ENGINE** Animation. **DODGE** Race track action. **STRINGALONG** Scrolling fun. **CASTLE** Medieval graphics. **MATHS CURVE** Angles and art. **NOTEBOOK** Trees.

On the May 1985 tape:
SKRAMBLE! Compulsive arcade action. **SHEEPNIM** The logic game. **TEXTWRITER** Screen utility. **LIFE** A cultured classic. **CEDRIC** Educational fun. **THREE-D** Outstanding utility. **SPOKES** Fascinating graphics. **MOONORBIT** Heavenly displays. **BLAZON** Heraldic devices. **FLOWERS** A Basic bouquet. **NOTEBOOK** Annotated animation.

On the April 1985 tape:
SUPER ARCHER Target practice. **BINARY SEARCH** Search data efficiently. **JOYPLUS** Switched joystick routine. **DDD ONE OUT** Educational fun. **POLYGONS** 3D rotation. **MONEY CRAZY** Arcade action. **STARCHART** The night sky. **FORTUNE TELLER** Horoscope. **COLLISION DETECTION** Alien encounters. **HILO** Guessing game. **NOTEBOOK** Hello to assembler.

On the March 1985 tape:
MR. FREEZE Ice cube arcade action. **SCREENDUMP** Two proberbilities for printer dumps. **FILLER** The machine code fill routine. **FRED'S WORD GAME** Educational fun. **BIG LETTERS** Large text utility. **PERCY** Beat the burning fuse. **ANIMATION** Two example programs. **PIGS** Frying bacon. **NOTEBOOK** Display formatting.

On the February 1985 tape:
CRAAL The mystifying maze adventure. **BOUNCY** Addictively annoying action. **PAIRS** Can you remember the cards? **BASE** A Binary/hexadecimal conversion utility. **CATCHER** Collect the eggs before they break. **CLOCK** Time keeping utility. **RACER** Grand Prix action. **NOTEBOOK** Graphics windows. **TRIG** All the right angles.

On the January 1985 tape:
SPACE BATTLE Destroy the deadly descending aliens! **NEW YEAR** A sound and graphics greeting. **ESCAPE FROM SCARGOV** Minefield action. **PIE CHART** Statistics made simple. **CLAYPIGEON** An Electron birdshoot. **ORGAN** Music maestro please! **NOTEBOOK** An original program. **RANDOM NUMBERS** Or not so random! **SNAKES** Reptilean arcade action. **CHEESE RACE** Beat rival mice.

On the December 1984 tape:
CHRISTMAS BOX Align the presents logically. **BILLY SANTA** Sort out the muddle. **SNAP** Match the Xmas pictures. **RECOVERY** The Bad Program message tamed. **CAROL** Internal Xmas music. **AUTODATA** A program that grows and grows. **NOTEBOOK** Simple string handling.

On the November 1984 tape:
STAR FIGHTER Anti-alien missions. **SCROLLER** Wrap around machine code. **URBAN SPRAWL** Environmental action game. **SPELL** Alphabetic education. **JUMPER** Level headed action. **CAESAR** Code breaking broken. **KEYBOARD** Typing game.

On the October 1984 tape:
BREAKFREE Classic arcade action. **ALPHASWAP** A logic game to strain your brain. **SOUND GENERATOR** Tame the Electron's sound channels. **MULTICHARACTER GENERATOR** Complex characters made simple. **RIGEL 5** Out of this world graphics. **MAYDAY** Help with your morse code. **NOTEBOOK** Palindromes and string handling.

On the September 1984 tape:
HAUNTED HOUSE Arcade action in the spirit world. **SPLASH** A logic game for non-swimmers. **SORT SHOWS** How sorting algorithms work. **SORT TIME** The time they take. **CLASSROOM INVADERS** Multicoloured characters go to school. **SAILOR** Nautical antics. **MATHS TEST** Try out your mental powers.

On the August 1984 tape:
SANDCASTLE The Electron seaside outing. **KNOCKOUT** Bouncing balls batter brick walls. **PARACHUTE** Keep the skydivers dry. **LETTERS** Large letters for your screen. **SUPER-SPELL** Test your spelling. **ON YOUR BIKE** Pedal power comes to your Electron. **SCROLLER** Sliced strings slide sideways.

On the July 1984 tape:
GOLF A day on the links with your Electron. **SOLITAIRE** The classic solo logic game. **TALL LETTERS** Large characters made simple. **BANK ACCOUNT** Keep track of your money. **CHARTIST** 3D graphs. **FORMULAE** Areas, volumes and angles.

On the June 1984 tape:
MONEY MAZE Avoid the ghosts to get the cash. **CODE BREAKER** A mastermind is needed to crack the code. **ALIEN** See little green men – the Electron way! **SETUP** Colour commands without tears **CRYSTALS** Beautiful graphics **LASER SHOOT** An intergalactic shooting gallery. **SMILER** Have a nice day!

On the May 1984 tape:
RALLY DRIVER High speed car control. **SPACE PODS** More aliens to annihilate. **CODER** Secret messages made simple. **FRUIT MACHINE** Spin the wheels to win. **CHASER** Avoid your opponent to survive. **TIC-TAC-TOE** Electron noughts and crosses. **ELECTRON DRAUGHTSMAN** Create and save Electron masterpieces.

On the April 1984 tape:
SPACEHIKE A hopping arcade classic. **FRIEZE** Electron wallpaper **PELICAN** Cross roads safely. **CHESSTIMER** Clock your moves. **ASTEROID** Space is a minefield. **LIMERICK** Automatic rhymes. **ROMAN** Numbers in the ancient way. **BUNNYBLITZ** The Easter program. **DODGUCK** The classic logic game.

On the March 1984 tape:
CHICKEN Test your nerve. **COFFEE** A tantalising word game. **PARKY'S PERIL** Parky's invisible maze. **REACTION** How fast are you ? **BRAINTEASER** A puzzling program. **COUNTER** Mental arithmetic. **PAPER, SCISSORS, STONE** Out-guess your Electron. **CHARACTER GENERATOR** Create shapes.

On the February 1984 tape:
NUMBER BALANCE Mental arithmetic. **CALCULATOR** Make your Electron a calculator. **DOILIES** Patterns galore. **TOWERS OF HANOI** The age old puzzle. **LUNAR LANDER** Test your skill. **POSITRON INVADERS** The old arcade favourite.

On the introductory tape:
ANAGRAM Sort out the jumbled letters. **DOODLE** Multicoloured graphics. **EUROMAP** Test your geography. **KALEIDOSCOPE** Electron graphics run riot. **CAPITALS** New upper case letters. **ROCKET, WHEEL, CANDLE** Three Sinaclairs programs. **BOMBER** Drop the bombs before you crash. **DUCK** Simple animation. **METEORS** Collisions in space.

See order form on Page 61

Adventure International on the Gold standard

THE latest news is that Adventure International UK has ceased trading but US Gold has taken over its product range, so all should still be available – watch this space for further details.

Good news for BBC adventurers is that *The Micro User* has a new adventure columnist, the Mad Hatter. He is prepared to answer all questions on BBC Micro games, so in future write to him instead of me.

I am having problems deciphering Eve Thompson's address. Would you write and give me your address Eve?

Many thanks to the following people – Paul Staite for his map, and Paul James for his map and solution to ***Gisburne's Castle,*** Chris Bailey for a map of ***Five Stones of Anedon,*** Chris Ottewill for his map of ***Eye of Zoltan,*** Jonathan Sambrook for his map and solution to ***Hampstead,*** and, finally, Benedict Seddon for his map of ***Citadel.***

David Sturgess asks when the next Top Ten is due. I have had a lot of demands for a Top Twenty, so next time I'll double up to a Top Twenty based on all the marks I have received since we started the scoring system.

David Stirling send in a full solution to ***Sorcerer of Claymorgue Castle.*** He used Ian Bevan's partial solution and went on from there to finish the game. Send an SAE if you want a copy.

Robert Henderson has sent in another interesting tip. When asked "Are you a wizard?" in ***Adventure,*** try typing in "Oui".

Several readers asked in which issues the two specials on ***Twin Kingdom Valley*** and ***Sphinx Adventure*** were published – July 1985 and January 1986, respectively.

Harjinder Burrha explained how to get unlimited moves in ***Countdown to Doom*** – plug in the cartridge and switch on, press Escape and then type LOAD "DOOM2" and, when it has loaded, list line 205 and change it to read 205 IF FNRS(78)>0 PROCM(286).

Brett Chandler, Megan McDonald and Joanna and Nicholas Fenwick have written from New Zealand to say that the following BBC adventures will run on the Electron – ***Perseus and Andromeda, Ten Little Indians*** and ***Circus*** by Digital Fantasia, and ***Neanderthal Man*** by Alligata.

Steve Rogers wants to know how to program the function keys to store commands to be used in adventures. The syntax for defining a function key is *KEY [number] [string]|M.

If you want to define a key so that a single keypress will allow you to open a door, type: *KEY 1 OPEN DOOR|M. The | character is found on the right cursor key and has to be Shifted to be used. |M simply inserts a Return so that the command is executed.

Gary Madison has produced a superb set of maps of ***Sphinx Adventure*** using his university's Macintosh computer. Please let me know Gary if I can copy them for readers.

Mike Herring seems to have used the least moves so far in solving ***Sphinx Adventure*** – 342. Has anybody done it in less? Incidentally, I have just received a comprehensive hint sheet for ***Citadel.*** Don't forget that SAE if you want a copy.

Diane Hurley has only just discovered *Electron User* and asks how long this column has been running. The first column appeared in the March 1985 issue and you can get copies of all the back issues.

Finally, I have decided that because my mail-bag keeps doubling every month, I'm going to have to concentrate on text adventures. So no more questions on arcade adventures please.

This month's Hall of Fame has a solution to ***Gisburne's Castle*** and there are also questions raised about ***Citadel.*** I don't think either of these can be considered as adventures and, though I'll publish any feedback I get about them, I am not prepared to consider them otherwise.

BUG HUNTERS

I have had another letter about ***Castle of the Skull Lord*** by Samurai Software. Kelvin Haste says that the program keeps crashing with the message No room at line 2150. I have written to them for a copy and I'll come back to you when I have it.

Steve Parkinson says that ***Strange Odessey*** crashes when he twists buckle. I'm not sure if he is wearing the belt when he does this but I'll give you more details when he lets me know.

By the way Steve, thanks for that useful ***Hampstead*** solution.

H. Bastien is finding quite a few bugs in ***The Ferryman Awaits*** from Kansas. In two locations he visits the game crashes.

HALL OF FAME

The quality and quantity of the tips sent in by readers continues to amaze me. This month sees the start of tips for ***Woodbury End***, ***Spiderman***, ***Wheel of Fortune*** and ***Gisburne's Castle***. I shall be serialising them over the coming months.

Woodbury End – *Les Shipton*

Here are the meanings of the clues given when you ask for help:

- Be wise with wise eyes. Get the spectacles from the raincoat pocket so that you can make sense of the signs.
- Can can clear the view. Spill the can of petrol then light it with the matches to set fire to the hut and you will gain access to the walled courtyard.
- Early one morn the curtains were torn. Hide behind the curtains when you hear people approaching.
- Twilight hours or ditto rum. If you are in the auditorium when you hear people approaching you should hide behind the scaffolding.

Spiderman – *Robert Henderson*

Go to the room with the lift, open the doors and enter the lift shaft. Go up the shaft until you are stopped and then PUSH UP. Go up and you will find yourself in the penthouse. Take the painting and remove the cover to reveal a piece of paper.

Take it and go to floor 3. CLOSE EYES and enter the ringmaster's room and then PUSH KNOB and TURN KNOB. You can now open your eyes.

Go to the office with the chemicals in and get the exotic ones. Go to the chemical laboratory and MAKE WEB. Go back to the office, get the acid and calcium, then return to the lab and mix them together.

Wheel of Fortune – *Craig Romans*

Go straight from the starting location to the crossroads and then east down beggar's walk, picking up everything as you go – the beggar will follow you.

Keep on going until you get to the location west of the vending machine, then move one location west and then back to the machine. Kick the machine and take the penny that falls out.

Go north until you meet the beggar and then turn round and follow him south. When he turns to retrace his steps follow him until you are one location north of the machine and then give him the penny.

Move south to the machine and empty the cup. Insert the penny that falls out into the machine for a box of matches. Go to one location north of the crossroads and drop the truncheon and then go west from the crossroads to the building.

Search round the building for the entrance and then unlock the door with the brass key and go in. Get the ladder and lamp and leave the key and watch where they will be safe. To leave the building type GO OUT at the door.

Go south from the crossroads to the stone obelisk and then DROP LADDER and EXTEND LADDER. Climb up the ladder to get the bucket. Now find the beggar and tell him to follow you.

Go to the well and tie the bucket to the rope. Then CLIMB INTO BUCKET and tell the beggar to lower you. Don't type anything while you are being lowered. You will eventually see an exit – use it.

Gisburne's Castle – *Paul James*

You need the lamp to enter the castle. Use the poison on your arrows so that you can kill the henchmen in the castle. If you use the wooden key in the trap door rooms without having the rope you will fall and die. To prevent this use the rope before using the key. Never drop the rope as you can get trapped on a floor quite easily without it.

The wooden key is used for opening the trapdoors and the metal key is used to open the iron doors. The sack helps you to carry more, and the bottle is needed to carry the oil.

FEEDBACK

This section is again dominated by the adventuring prowess of Geoff Larsen.

To get ***Gold Baton*** in the game of the same name you need to feed the slugs to the giant crab, sail across the lake in the small raft, blow the horn and then throw the knife.

To finish the game in ***Hampstead*** Carl Barlow should return to the Oxfam shop by car, change back into his tracksuit, pick up his bike and go into Hampstead.

For Michael Peters to be able to return to the ship in ***Strange Odessey*** he must make the plastic set in the wall glow one times – (sic) which is done as follows: PULL ROD, RUB PLASTIC – the plastic glow one times (sic) – which is PLASTIC – it then glows one time. Michael should now go back through the curtain of light.

Geoff has completed ***Strange Odessey*** and says that he doesn't think you can translate the writing on the boulder.

SOS

To my eternal shame there are quite a lot of problems I can't answer this month – I'll get the worst over with first.

Has anytone solved ***Mayday?*** I just can't seem to get going in it. Jeff Fraser can't get the patch from the cargo hold and Jonathan Blair keeps running out of time.

There are requests for help with several adventures that I haven't heard of before. Luke Robertson wants to know how to get past the hound, climb the steep path and get out of the goblin graveyard in Usborne's ***Silver Mountain***. He also needs help to get past the irate gamekeeper in ***Ten Little Indians***.

M. Watts needs help with ***Xanadu***. She can't get into the gate to the pleasure dome, despite having the credit card.

Keith Scotmorn and Matthew Sheppard are in trouble with ***Boffin***. You are quite right Keith, this isn't my department. Can anyone help them get past the spider on level 2?

Russell Blake needs help with ***Wizard of Akyrz***. He wants to know what to do after returning the fox to its home. It's a long time since I saw this game, but doesn't he have to make a close examination of the chicken run?

Alan Allcock has the BBC version of ***Old Father Time***, a Bug-Byte game, and he can't read the Greek word on the coin. Past the boulder and through the wooden door to the east is some writing on the wall which he also can't read, and there is an unstable beam of light here that he can't pass.

I think the writing on the wall is the password to get through the beam but is anyone certain?

Harjinder Burrha is in trouble with several games.

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Can anyone help with the following?

In ***Gold Baton*** how do you light the matches or the oiled rag and get past the black knight in the castle courtyard?

In ***Time Machine*** how do you get past the brontosaurus and out of the passage under the sphinx?

In ***Circus*** how do you get into the maintenance room?

Finally, how do you get out of the first three rooms in ***Escape from Pulsar 7***?

Keith Inman and Andrew Rogers are both stuck in ***Citadel***. How do you get to the star port, raise the drawbridge, get into the temple past the wolf, kill the mummies, find the green/blue key to open the door to the well wheel, get to the palace and get past the man in the witch's house?

What do the five crystals look like and if they are the Cs in the buildings how do you get to them? Has anyone got the answers?

CONTACT CORNER

Unable to find anyone with your fascination for adventures? Write to one of the adventure fanatics below, and if you want readers to write to you just let me know.

Philip Mardlin, 10 Tavistock Street, Nelson, Lancs. BB9 9JH.

Joan Davies, 103 Keswick Road, Ridge, Lancaster LA1 3LW.

Richard Meloni, 65 Central Avenue, Hounslow, Middlesex TW3 2QW.

Michael Pemberton, 11A Trent Road, Nelson, Lancs. BB9 0NY.

Derek Willoughby, 19 Humber Close, Airedale, Castleford, W. Yorks. WF10 3DU.

Martyn Amos, 1 East Town House, Heddon-in-the-Wall, Newcastle-upon-Tyne NE15 0DR.

Graeme Moore, 28 Eamont Avenue, Crossens, Southport, Merseyside PR9 9XU.

John Tipper, 7 Main Street, Newbold Verdon, Leics. LE9 9NL.

Les Shipton, 3 Chestnut Close, Wymington, Near Rushden, Northants NN10 9LX.

Steve Parkinson wants help with ***Hampstead, Stolen Lamp, Terrormolinos*** and ***Eye of Zoltan*** – he has nearly completed the last two. Ring: 0272 686195.

Finally, someone has sent their address and telephone number, but not their name – 10 Renton Lea, Guiseley, near Leeds LS20 8LU. Tel: 0943 73954.

If you want to be mentioned in Contact Corner remember to enclose your name and address – preferably in large capital letters.

PROBLEMS . . . PROBLEMS

A much reduced section this month, mainly because Hall of Fame answers most of the problems raised. Each month it seems that the same old questions get asked, so please read back issues before writing in to ask for my help.

Andrew Watt can't get started in ***Strange Odessey***. Press a button.

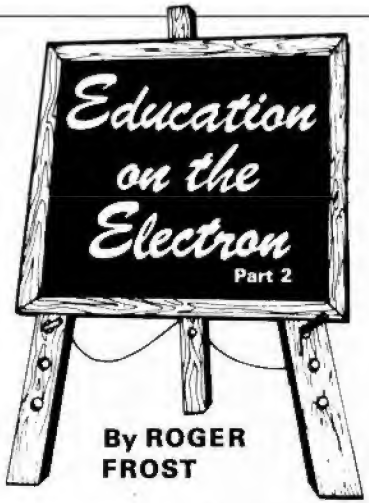
Alex Smyth can't find the fairground in ***Woodbury End***. Go north from the village then clockwise round the trees and then go north again.

Sue Johnstone must explore the maze to find the answer to the seeming dead end in ***Greedy Dwarf***.

Mary Wilde can't find the cheese in ***Philosopher's Quest***. The cheese is gorgonzola and can be found and collected if you use a gas mask.

Finally, can I remind you all to enclose an SAE when you write in with a problem. I can't guarantee you'll get an answer unless you do.

Databases – reference libraries of the '80s



By ROGER FROST

MANY of the most useful pieces of computer software used in schools are not based on one particular subject.

The word processor which we looked at last month is one such program. It has no actual learning content, but its use can improve the quality of education in many areas.

This month's topic is also content free, which seems a strange term for programs that get crammed with information. I refer to what are usually called databases.

Most people, when they talk of databases, really mean a program used for gaining access to a store of information.

Ceefax and Oracle are examples. They contain vast amounts of information which you can read if you have the right hardware and software.

While such enormous stores of information are useful, and in fact more and more schools are obtaining facilities for receiving them, you can only gain the information in the form that the TV companies send it to you. Analysing the facts from these databases will mean a lot of paper work.

Many teachers regard the ability to access data from a database as a prime skill needed by all pupils. In fact it would not be too far fetched to call databases the reference libraries of the 1980s.

No doubt as we move to the 21st century and yet more facts are crammed into electronic storage, it will become essential to know how to make best use of databases.

In schools the sort of information that children use is often directly related to the locality. Pupils might survey their local shops and keep records of the sorts of products they can buy there.

A data interrogation program allows the facts to be sorted out in different ways. For example, what can be bought at Fred's shop? Or, from which shops can I buy *Electron User*?

A criticism of education in the past has been that pupils may spend a lot of time collecting data, but very little time interpreting it.

The computer, along with the database program, can make such interpretation a far easier task.

Children of all ages and abilities will find themselves using database programs in school. For some programs they will collect their own data, but for much of the time they will use information provided for them.

Entering the data in the first place is a long and tedious job which is only for the real enthusiast. No one benefits much by just copying facts from one place to another. I would not normally expect pupils to do it.

Census data is often given to children for analysis. This is of real interest to students of all ages, particularly if it relates to their own part of the country.

Of course, such a document could be equally well presented in book form as on a database, but the computer is able to display the material in different formats and makes light work of handling the information.

For instance, if pupils want to compare the life spans of coal miners and shop keepers the relevant information can be called to the screen without needing to sift through lists of vicars and farmers as well.

Such a store of information can be used for pure fact finding, perhaps to see if anyone named Smith lived in Castle Street in the 1880s.

However it is probably of greater educational value if it motivates the children to put forward their own hypotheses and then test them out.

Some programs designed for a specific purpose actually have the data built into them. These may contain information on road traffic accidents or may have phoney police records.

Such programs are usually designed just for school use. Within a school some hundreds of pupils may each use the program for 15 minutes, and that earns its keep. This kind of situation is clearly not suited to home computer usage.

Perhaps the simplest of home uses is to produce a family database. For young children it might have just the names of relatives and their birth dates. Each month a youngster could look up who had a birthday, and on what date.

For older children the database could be extended to be a family tree. Most families have interesting characters and children enjoy finding out about them.

The next stage will involve children in creating their own base of information. The database then becomes an adjunct to another hobby. Details of a collection could be kept, or bird watching records could be entered.

I would not expect children to spend all that long on other people's information. If they make their own they will have seen a need for it and will use it accordingly.

The point to note here is that using database programs is not an end in itself. They are used to make an entirely separate task much easier. If that is not achieved they are a waste of time.

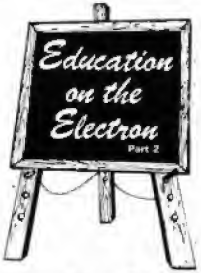
A word of warning here for parents. If your children start to use the computer for a real purpose they are going to demand a disc system.

Disc systems are quicker than cassettes, and enable a much larger base of information to be stored. This is because the computer does not need to hold all of the data in its memory at once, as it can read it in from the disc as required.

To make really effective use of a database a printer is also required, so expect requests for large sums of money.

Two main types of database program are available to the home user. The first of these is the branching tree, in which an object's identity is held as a series of yes or no answers to simple questions.

The data ends up as an identification key, and could cover any area. For example, a child with an interest in



From Page 51

farming could produce a key for farm animals.

The beauty of these programs is their simplicity. They require no thought in advance, and data can be added as a youngster thinks of it. If used properly these programs can develop a child's critical observation and logical thinking.

While branching tree programs are easy to use, no one would ever consider them as serious stores of information, as they lack the ability to sort data and find particular items. They are, none the less, very good programs for learning about the way in which data can be stored.

Two excellent versions of this type of program are Tree of Knowledge from Acornsoft and Animal, Vegetable, Mineral from Bournesoft – both run on our faithful Electrons.

The more sophisticated type of database are known as field programs. These correspond to record cards as kept in a filing cabinet. Their great virtue is the ability to organise the filing system in any way the user chooses.

So for the earlier example of a family database the records could be sorted by name, age, phone number, or by any other piece of information that is kept.

It is this ability to do rapid searches and sorts that gives field databases their amazing power. Using this type of program does require advance thought.

It is often very difficult to add extra information to a record. For example, if you set up a family database without space for phone numbers it may be impossible to add them later.

A good, cheap database available for the Electron is Mini Office. This has most of the features that a child would require, but falls down on its search facilities.

Only single field searches are possible, so it would be impossible to search for all those relatives who were born in June and who don't live in Birmingham. Even so, when combined with the word processor, this piece of software is almost a must for educational usage.

The database that pupils will probably use in secondary schools is called Quest. This BBC Micro software, produced by the Advisory Unit for Computer Based Education (AUCBE) runs well on the Electron, but may produce some odd bits of Mode 7 graphics.

It allows for very complex searches, but is thus much more difficult to use and not suitable for younger users.

For Plus 3 users, Acornsoft have produced a disc database. This has many complex and sophisticated features which are ideal for older children, but is still simple to use at more elementary levels.

If you really want to store a lot of data then a ROM-based system will be needed. Such items are produced by Slogger and Acorn but, of course, come rather more expensive than cassette software.

That just about wraps up databases – a really valuable aid to effective education for children of all ages and abilities. Next month it will be the turn of the under-sevens as we consider Electrons, infants and education.

Micro Messages

Now top software is flooding in

WELL, what a change! With hardly any quality software around a year ago, now it is flooding in – Exploding Fist, Beach Head and Gyroscope to name a few.

As with many other Electron users I was cheesed off with the software and peripheral market some months back, but now the computer firms are realising the Electron's potential.

I was tempted to save up for the Plus 1 when I saw the initial range of cartridges, but now a year after its launch, there are still only nine cartridges, all by Acornsoft.

Why not include a top 20 software chart, and screen shots to show what the games look like? Keep up the good work. – **David Guyatt, Bristol.**

● You're right, there are very few ROM cartridges available for the Electron. ACP supplies blank ROM cartridges so you can make your own up from the ROMs available. Slogger produces 10 ROMs and ACP three to name just two companies, so there's no shortage.

The Plus 1 is more than just a means of plugging in ROM cartridges. It enables you to use joysticks, printers, some disc drives, sideways RAM and there's more to come.

We'll bear in mind the top 20 chart and you should find that most of the software reviews have screen shots.

Checking with Alan

PLEASE pass on to Alan McLachlan many thanks for his very amusing and true to life section. We all have problems but only by exact checking can we ever sort them out.

If I have trouble with a listing I do one of three things – leave it if I have been on the program for a while and go back, get others to check my listing or get a hard copy and check this with the magazine.

Finally in Micro Messages for May 1986 there was a small program for switching off the Plus 1.

This could be programmed into the function keys. If this is done then there is no need to keep putting it in again and again as the function key program stays in even if Break is pressed.

Does anyone know if joysticks can be used with the Electron version of Elite and how it can be accomplished? – **J.M. Walters.**

● Elite does not work with joysticks, nor, to the best of our knowledge, is there any way of making it do so.

Well thought of Lynx

COULD you please tell me if you have done a review of Combat Lynx?

I have been having the Electron User *magazine since December 1985 and think it is a really helpful and interesting magazine.*

I have Combat Lynx and would like to know what you think of it. – **Simon Hotchkiss, Shrewsbury.**

● Adam Young reviewed Combat Lynx in the August 1985 issue of *Electron User*.

His review ended: "Together with the very professional packaging, this all adds up to a superb game, thoroughly recommended".

Choosing a disc drive

I WOULD like your expert advice on disc drives for the Electron. Can the Cumana disc interface connect other makes of drives like Pace or Mitsubishi as well as all the Cumana drives?

Also could you tell me if the Mitsubishi single 5¼ inch 40/80+ drive supplied by Watford Electronics is compatible with one of the Electron interfaces.

In all the adverts in Acorn User *the makers refer to the drives as BBC drives – even the Cumana drives which are advertised in the* Electron User*!*

I hope you can help a confused reader. – **Graeme Padgham, Tonbridge, Kent.**

● Any type of disc drive can be used with the Cumana disc interface or ACP's Plus 4 disc interface, providing it has its own power supply.

Since the majority of BBC Micro owners with disc drives use 5¼in drives it would make sense to use this format as well, then you can exchange discs with friends with BBC micros.

The drive from Watford is fine if it has its own power supply.

Getting to the top

I READ Neil Windsor's troubled letter with interest in the April edition, and thought this might relieve his misery regarding the use of his View word processor cartridge on the Plus 1.

The advice you gave him will still cause his printer to start printing further down the page, because you omitted to mention that there is a default setting on the cartridge designed for the initialisation of book chapters.

I suggest that to print at the top of a page he should adopt the following procedure.

PE – this text command gets rid of the default setting.
TM 0
HM 0
PL – normally default 66 but a maximum of 255 may be selected.

Using PRINT is not advisable under the circumstances. Much better to type SHEETS followed by M to get rid of the default setting. Now press any key and your printer will start at the top of the page.

Congratulations on your magazine. It's far superior to anything else around, and highly readable.

*I have a question you may be able to help me with. Is there an *FX call I can use to slow down text printed on to the screen from within a program?*

I have consulted the Ad-

→

ALL programs printed in this issue are exact reproductions of listings taken from running programs which have been thoroughly tested.

However, on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

From Page 53

*vanced User's Guide and it would seem that the only delay setting applications available are through keyboard input. I've tried *FX11, *FX12, *FX194, *FX195, *FX196, *FX197 all to no avail.*

Can you tell me where I am going wrong, and what I need to do? – **David Akenhead, Lewisham.**

● Slomo from Nidd Valley can be used to slow down the Electron. The problem is that everything slows down, not just printing.

Speed gain appreciated

I HAVE just installed Slogger's Turbo-Driver in my Electon and would like to pass on to you and your readers my total support for this add-on, the best thing since the Plus 3.

The machine reacts so much faster when the Turbo is engaged, and magazine listings even those non-Mode 7 listings for the BBC Micro, truly take on arcade speed.

At £29.95 this must be the best bit of hardware around for the Electron. A word of warning however, fitting is not recommended at home for those inexperienced with a soldering iron.

If only someone could now come up with the memory saving Mode 7 add-on, the Electron with its superior keyboard, disc filing system and ROM boards would leave the BBC Micro in the shade.

Thanks for an excellent magazine, I suppose with Turbo installed, I must think about taking out a subscription to your sister magazine as well. – **B. Matthews, Wrexham.**

● Slogger's Turbo-Driver is excellent and there's a full review coming up shortly. In some tests the Turbo Electron was running 300 per cent faster.

WHAT would you like to see in future issues of Electron User?

What tips have you picked up that could help other readers?

Here is your opportunity to share your experiences.

Remember that these are the pages that you write yourselves. So tear yourself away from your Electron keyboard and drop us a line. And please, if you want a reply, enclose an SAE. The address is:

Micro Messages
Electron User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.

Converting algorithm

PLEASE could you help me with a small problem. I wish to convert the algorithm:

```
address=&5800+(&10*?&70)+(&
140*?&71)
```

into machine code, but so far the code needed takes up a whole page of memory. I would be very grateful if you could show me a shortened machine code listing of the equation. – **P. Tonkin, Dorset.**

● The equation looks like one for calculating the screen address of a character given its x,y coordinates. This is actually an easy calculation if you go about it in the right way.

Two tables are required, one &10 times and the other &140 times. The x and y coordinates are used to index into these tables and pick out the required answer. It only takes 25 bytes of code.

```
10 REM X,Y -> Address
20 REM &70/&71 = X,Y
30 REM &72/&73 =address
40
50 FOR i=0 TO 3 STEP 3
60 P%=&900
70 [ OPT i
80 LDA &70:ASL A:TAX
90 LDA &71:ASL A:TAY
100 CLC
110 LDA table2,X
120 ADC table1,Y
130 STA &72
140 LDA table2+1,X
150 ADC table1+1,Y
160 STA &73
170 RTS
180 ]
190 table1=P%
200 FOR j=0 TO 31
210 !P%=&5800+j*&140
220 P%=P%+2
230 NEXT
240 table2=P%
250 FOR j=0 TO 19
260 !P%=j*&10
270 P%=P%+2
280 NEXT
290 NEXT
```

Store the x,y coordinates in &70 and &71 and CALL &900. The address is placed in &72 and &73, low byte, high byte.

Disc drives for school use

TO add to the recent correspondence on Electon disc drives here are my experiences, both as a keen home user and as head of maths at a comprehensive school where we have raised money to buy four Electrons for the maths department.

As soon as they came out I bought a Plus 3 for my Electron at home. It has proved fast and reliable, but I knew it would not be suitable at school for pupils and teachers who are not computer experts.

For instance, if you touch Break when a program is downloaded over the disc system (necessary for most programs) what a performance to get the ADFS to operate again!

*Even a changed disc requires *MOUNT to be typed in, not to mention the confusion caused by the different directories, apparent even on the Welcome disc supplied by Acorn.*

Thus when enough money was raised to provide two of our Electrons with disc drives, the choice seemed to be between Solidisk and Cumana.

The Solidisk interface looked better on paper, but unfortunately the firm failed to answer my letter and it was virtually impossible to get through on the telephone to anybody who knew what they were talking about.

In despair I telephoned Cumana. Within a minute I was put on to an expert, a most favourable price was quoted, and withing four days of our cheque being sent off the interfaces and 5.25in drives arrived.

It certainly seems that the right decision was made. With PAGE the same as with the tape system, unlike the BBC DFS, tape to disc transfer is easy, the instructions in the handbook working with all but the most protected software.

The conversion utility allows programs to be used on our Electrons as well as the computer department's BBCs.

With room for 90 files on the Cumana discs we are three times better off than the BBC DFS. Teachers and pupils have no problems – they certainly did with the tape recorders.

Disadvantages? Loading and saving is not as fast as the Plus 3 or DFS.

We have excellent computers and disc drives – all we need now is more decent educational software to run on them. – **O.F. Foreman, Tuxford Comprehensive School, Newark.**

Plus 3 database

I RECENTLY bought a Plus 3 for my Electron and require information concerning the database disc which was supplied with the unit.

According to the booklet it is suggested that the database

program be transferred on to a blank formatted disc.

*Please could you tell me how this program can be transferred, as after formatting all I tend to get on *DIRCOPY facility is Bad command.* – **M. Lowdon, Thornton Heath, Surrey.**

● DIRCOPY is a utility supplied in the Welcome disc. To use it place the disc in the drive and press Ctrl + A + Break. Then enter *DIRCOPY and follow the instructions on the screen.

It's a good idea to use DIRCOPY to back up the utilities on the Welcome disc as you are stuck without them if your disc ever goes down.

Program protection

I FREQUENTLY show my friends my programs but they always break into them.

*I have used *FX200,3 and *FX229,1 to disable the Escape key and to wipe out a program when Break is pressed, but just before a program loads they press Ctrl + Shift then Escape and list it.*

I have made a loader for the programs and disabled Ctrl but they just wipe out the line and run it so that I do not know what to do.

*In programs like Torrormolinos they use *RUN in their loader programs and you cannot break into those.*

Could you advise me what to do. – **Adrian Hollis, Nottingham.**

● Program protection is quite a complex topic, and one we can't really go into here.

To prevent a program from being listed add the following lines to it:

```
9000REM Add REM's like...
9010REM **********
9020i=PAGE
9030REPEAT
9040IF ?(i+4)=&F4 !(i+8)=&
150C
9050REPEAT
9060i=i+1
9070UNTIL ?i=&0D
9080UNTIL i=TOP-2
```

Next go through your program adding lines like line 9010. It is important that they are exactly the same, with no extra spaces.

Lastly type GOTO 9000 and then save the program when it has finished its task.

This short routine alters the REM statements, preventing the program from being listed.

Egged on, marched off...

I SO much enjoyed both typing and using your program Easter Egg Chase that I am moved to congratulate both you and its author on an excellent, structured and elegant product.

It has also proved thoroughly enjoyable to my three boys aged from three to eight.

This is, sadly, in contrast to the usual offerings, such as Marching Order, which use tortuous and illogical programming to glorify the name on the title page and are obviously hurriedly cribbed from outdated BBC Micro offerings where teletext mode and a faster speed may have made them just acceptable.

Incidentally, although I enjoyed your dig at us program typists and recognised many of my own early frustrations in your cameos, your publication is not totally innocent. Marching Order has a bug in it as printed and Fruitworm had a printing error.

Keep up the good work and please may we have more family and educational programs, especially of the quality of Easter Egg Chase. – **Ian M. Stewart, Preston.**

● We're please you liked Egg Chase. Marching Order is neither tortuous nor illogical, although we must admit the use of very short variable names and long multistatement lines do make it difficult to follow.

There is a bug which only occurs on the highest level. It can be cured by changing *C%(4)* to *C%(10)* in line 270. The correct line is:

```
270 LDI=1:DIM BI(9),CI(10
):VDU 23,241,255,255,255,25
5,255,255,255,255,23,242,56
,56,146,124,16,40,40,40:REP
EATUNTILINKEY(-99)=0:*FX20
```

Marching Order first appeared in our sister publication *Computing with the Amstrad.*

Unfortunately a quote was missed off line 360 in Fruit Worm. It should end "" and not ". The correct line is:

```
360IFSI>=PIANDLI<7SOUND1,
2,50,6:LI=LI+1:PI=PI+5E888:
QI=AI:WI=BI:BI=2:AI=LI+6:CA
LLup:AI=QI:BI=WI:a$="" ELSE=
```

Try the gorilla

COULD you please tell me if there are any good versions of the arcade game Donkey Kong for the Electron?

I already own a Donkey Kong cartridge for an Atari 2600, but I am disappointed with it. The game has only two screens which can get boring. – **S.S. Nijjar, Ilford.**

● Micro Power's Killer Gorilla is an excellent version of Donkey Kong with four screens.

Repton boulders

I HAVE found a simple method with boulder problems in Repton – make a sketch of your dig and place tiddly-wink counters on the sketch.

The moves can be worked out by moving the counters to various positions to solve the problem. – **Ray Lennard, Macclesfield.**

PS: Don't worry about the future format of Electron User, *it is fine as it is.*

● Thanks for the Repton tip, we are sure it will help many frustrated readers.

Thanks too, for the vote of confidence in the magazine.

No easy re-start

WHEN checking a lengthy program it is often necessary to interrupt execution to verify correct operation, see how far it has got, and check the status of the variables.

This can be done after stopping the program by Escape but then there seems to be no way of re-starting execution from the point at which it stopped. (GOTO doesn't work if the program stops in the middle of a loop).

I feel sure re-starting must be possible on such a clever machine as the Electron. Even the little Aquarius I used to have understood STOP and CONTinue. But it certainly isn't covered in the handbook. – **C.W. Smith, Ruislip.**

● Whenever a PROC, GOSUB or FOR ... NEXT is encountered Basic stores information on a stack.

This information tells Basic where to return to when the PROC or GOSUB has been completed, or where to jump back to in the case of FOR ... NEXT.

When Escape is pressed the stack is cleared and all the information is lost. It is therefore impossible to continue if Escape is pressed during one of these routines.

Sphinx special

I HAVE recently bought an Electron and am addicted to Sphinx Adventure. I have started to buy Electron User *and imagine how I felt when I discovered that you have already done a Sphinx special and I missed it.*

Can you tell me which back number to buy as I can't afford to buy them all at present. – **M. Gisborne, Portsmouth.**

● The Sphinx special was in the January 1986 issue of *Electron User.*

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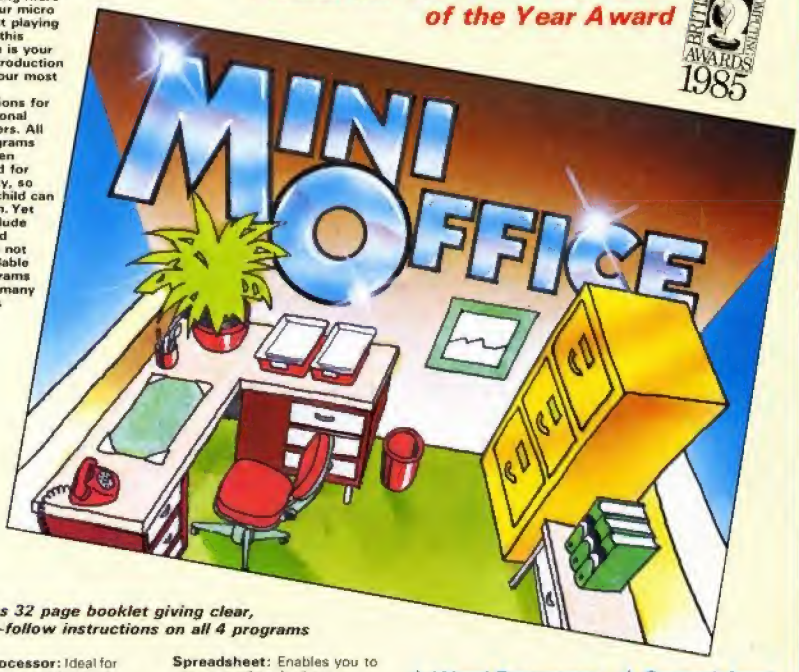

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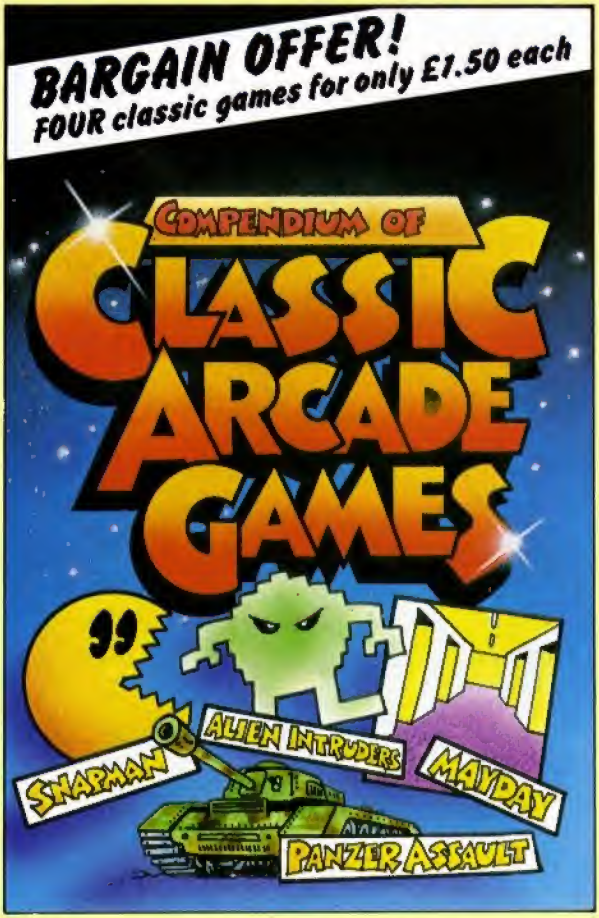

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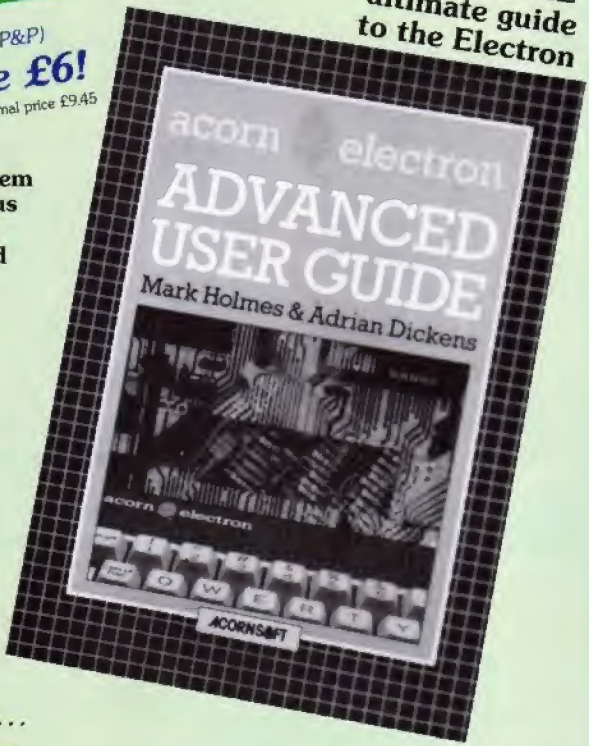

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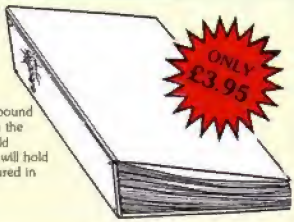

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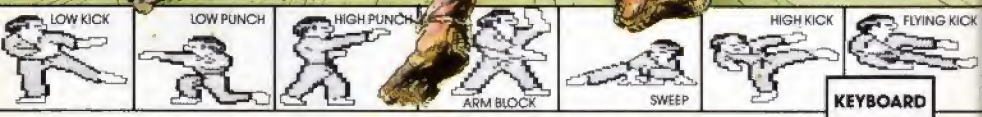

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Set in the realm of the mystic Orient, Karate Combat pairs you, in thrillingly realistic battle, against 16 of the mightiest and most skilful exponents of "open-hand" fighting. Each opponent has different fighting characteristics and you must cunningly use different techniques to tackle each adversary. Your aim is to move up the rankings and eventually do battle against the 16th opponent, the ultimate challenge — The Master! In addition to the competition mode, the program includes a 2-player mode and a practice mode, complete with a punch-bag, to enable you to master your repertoire of punches, kicks, blocks, spins, sweeps and the spectacular flying kicks.

PRICE: £8.95 (cassette), £11.95 (BBC disc)

COMPETITION COMPETITION COMPETITION COMPETITION

COMPETITION — If you defeat The Master you can enter our competition with a chance of winning an impressive trophy (pictured on the right) and the cash prize of **£100.** Closing Date: 30th September, 1986.

SUPERIOR SOFTWARE Limited

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Access VISA

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post
- Postage and packing is free
- Faulty cassettes and discs will be replaced immediately

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